User's Manual

Voltage Fluctuation/Flicker Measurement Software (IEC 61000-3-3 Compliant)

More Application, Information, and Pricing available at:
TestWorld
250 Technology Way
Rocklin, CA 95765
sales@testworld.com
1-855-200-TEST (8378)
Click to go www.TestWorld.com

YOKOGAWA
Yokogawa Meters & Instruments Corporation

IM 761922-07E
4th Edition

Product Registration

Thank you for purchasing YOKOGAWA products.

YOKOGAWA provides registered users with a variety of information and services.
Please allow us to serve you best by completing the product registration form accessible from our homepage.

http://tmi.yokogawa.com/

Thank you for purchasing the Harmonic/Flicker Measurement Software (Model 761922). This user's manual describes the handling precautions, functions, and operating procedures of the Voltage Fluctuation/Flicker Measurement Software within the Harmonic/Flicker Measurement Software. To ensure correct use, please read this manual thoroughly before beginning operation.
Keep this manual for quick reference in the event a question arises.
For information about the handling precautions, functions, and operating procedures of WT3000 Precision Power Analyzer and the Harmonic Measurement Software as well as the handling and operating procedures for Windows, see the manuals for those products.

Notes

- The contents of this manual are subject to change without prior notice as a result of continuing improvements to the instrument's performance and functions. The figures given in this manual may differ from those that actually appear on your screen.
- Every effort has been made in the preparation of this manual to ensure the accuracy of its contents. However, should you have any questions or find any errors, please contact your nearest YOKOGAWA dealer.
- Copying or reproducing all or any part of the contents of this manual without YOKOGAWA's permission is strictly prohibited.
- The TCP/IP software of this product and the document concerning the TCP/IP software have been developed/created by YOKOGAWA based on the BSD Networking Software, Release 1 that has been licensed from University of California.

Trademarks

- Microsoft, Windows, Windows XP, Windows Vista, Windows 7, and Excel are either registered trademarks or trademarks of Microsoft Corporation in the United States and/or other countries.
- Adobe and Acrobat are trademarks of Adobe Systems Incorporated.
- Other company and product names are registered trademarks or trademarks of their respective holders.
- For purposes of this manual, the ® and TM symbols do not accompany their respective registered trademark names or trademark names.

Revisions

1st Edition: June 2009
2nd Edition: October 2010
3rd Edition: April 2012
4th Edition: December 2013

4th Edition: December 2013 (YMI)
All Rights Reserved, Copyright © 2009, Yokogawa Electric Corporation
All Rights Reserved, Copyright © 2010, Yokogawa Meters & Instruments Corporation

Notes about Using This Software

Storing the CD-ROM

Keep the original CD-ROM for this software in a safe place. To use this software, install it on a PC hard disk, and run it from the PC.

Using the Software

- Do not operate the WT while using this software. Doing so may cause errors.
- Disable the PC's standby mode. When a PC goes into standby mode, it may stop this software's operations.
- This software can only control one WT at a time. Also, it cannot connect multiple PCs to the same WT.
- If a connection error disrupts the connection between the WT and the PC, turn the WT OFF and then ON again.

How to Use This Manual

Structure of the Manual

This user's manual consists of the following sections.

Chapter	Title	Description
1	**Product Overrview**	Explains the software's features and the details of its applicable standards.
2	**Preparation before Use**	Explains how to connect the WT3000 to a PC and how to install this software.
3	**Starting and Using the Software**	Explains how to start the software and describes the main window.
4.	**Using the Start and Exit Pages**	Explains how to select a test schedule menu and how to close the software.
5	**Using the Open Page to Load Measured Data and Setting Information**	Explains how to load setting information and measured data.
6	**Using the Connection Page to Establish a Connection between the PC and a WT**	Explains how to establish a connection between the WT3000 and a PC.
7	**Using the Setting Page to Configure Measurement and Judgment Conditions**	Explains how to set general test conditions.
8	**Using the Measure Page to Make Measurementsa**	Explains how to execute a compliance test.
9	**Using the Analysis Page to Display Judgment Results and Measured Data**	Explains how to display judgment results and measured data.
10	**Using the Print Page to Print Reports**	Explains how to print a report.
11	**Using the Save Page to Save Setting Information and Measured Data**	Explains how to save setting information and measured data.
12	**Other Features**	Explains how to arrange windows, use the help function, and display the software's version information.
13	**Troubleshooting**	Lists various error messages.
14	**Specifications**	Lists the specifications of the software.
Index		

Software Versions That This Manual Applies To

This manual applies to IEC 61000-3-3-compliant WT3000 Voltage Fluctuation/Flicker Measurement Software versions 6.01 or later. If you are using an older version, you will not be able to use all of the features described in this manual. The software version is displayed in the upper right of this software's window. For details, see section 12.4.

Terms and Conditions of the Software License

Yokogawa Electric Corporation and Yokogawa Meters & Instruments Corporation, a Japanese corporation (hereinafter called “Yokogawa”), grants permission to use this Yokogawa Software Program (hereinafter called the “Licensed Software”) to the Licensee on the conditions that the Licensee agrees to the terms and conditions stipulated in Article 1 hereof.
You, as the Licensee (hereinafter called “Licensee”), shall agree to the following terms and conditions for the software license (hereinafter called the “Agreement”) based on the use intended for the Licensed Software.
Please note that Yokogawa grants the Licensee permission to use the Licensed Software under the terms and conditions herein and in no event shall Yokogawa intend to sell or transfer the Licensed Software to the Licensee.
Licensed Software Name: Harmonic/Flicker Measurement Software (IEC 61000-3-3 Compliant)
Number of License: 1

Article 1 (Scope Covered by these Terms and Conditions)
1.1 The terms and conditions stipulated herein shall be applied to any Licensee who purchases the Licensed Software on the condition that the Licensee consents to agree to the terms and conditions stipulated herein.
1.2 The “Licensed Software” herein shall mean and include all applicable programs and documentation, without limitation, all proprietary technology, algorithms, and know-how such as a factor, invariant or process contained therein.

Article 2 (Grant of License)
2.1 Yokogawa grants the Licensee, for the purpose of single use, non-exclusive and non-transferable license of the Licensed Software with the license fee separately agreed upon by both parties.
2.2 The Licensee is, unless otherwise agreed in writing by Yokogawa, not entitled to copy, change, sell, distribute, transfer, or sublicense the Licensed Software.
2.3 The Licensed Software shall not be copied in whole or in part except for keeping one (1) copy for back-up purposes. The Licensee shall secure or supervise the copy of the Licensed Software by the Licensee itself with great, strict, and due care.
2.4 In no event shall the Licensee dump, reverse assemble, reverse compile, or reverse engineer the Licensed Software so that the Licensee may translate the Licensed Software into other programs or change it into a man-readable form from the source code of the Licensed Software. Unless otherwise separately agreed by Yokogawa, Yokogawa shall not provide the Licensee the source code for the Licensed Software.
2.5 The Licensed Software and its related documentation shall be the proprietary property or trade secret of Yokogawa or a third party which grants Yokogawa the rights. In no event shall the Licensee be transferred, leased, sublicensed, or assigned any rights relating to the Licensed Software.
2.6 Yokogawa may use or add copy protection in or onto the Licensed Software. In no event shall the Licensee remove or attempt to remove such copy protection.
2.7 The Licensed Software may include a software program licensed for re-use by a third party (hereinafter called “Third Party Software”, which may include any software program from affiliates of Yokogawa made or coded by themselves.) In the case that Yokogawa is granted permission to sublicense to third parties by any licensors (sub-licensor) of the Third Party Software pursuant to different terms and conditions than those stipulated in this Agreement, the Licensee shall observe such terms and conditions of which Yokogawa notifies the Licensee in writing separately.
2.8 In no event shall the Licensee modify, remove or delete a copyright notice of Yokogawa and its licenser contained in the Licensed Software, including any copy thereof.

Article 3 (Restriction of Specific Use)
3.1 The Licensed Software shall not be intended specifically to be designed, developed, constructed, manufactured, distributed or maintained for the purpose of the following events:
  a) Operation of any aviation, vessel, or support of those operations from the ground;,
  b) Operation of nuclear products and/or facilities;,
  c) Operation of nuclear weapons and/or chemical weapons and/or biological weapons; or
  d) Operation of medical instrumentation directly utilized for humankind or the human body.
3.2 Even if the Licensee uses the Licensed Software for the purposes in the preceding Paragraph 3.1, Yokogawa has no liability to or responsibility for any demand or damage arising out of the use or operations of the Licensed Software, and the Licensee agrees, on its own responsibility, to solve and settle the claims and damages and to defend, indemnify or hold Yokogawa totally harmless, from or against any liabilities, losses, damages and expenses (including fees for recalling the Products and reasonable attorney’s fees and court costs), or claims arising out of and related to the above-said claims and damages.

Article 4 (Warranty)
4.1 The Licensee shall agree that the Licensed Software shall be provided to the Licensee on an “as is” basis when delivered. If defect(s), such as damage to the medium of the Licensed Software, attributable to Yokogawa is found, Yokogawa agrees to replace, free of charge, any Licensed Software on condition that the defective Licensed Software shall be returned to Yokogawa’s specified authorized service facility within seven (7) days after opening the Package at the Licensee’s expense. As the Licensed Software is provided to the Licensee on an “as is” basis when delivered, in no event shall Yokogawa warrant that any information on or in the Licensed Software, including without limitation, data on computer programs and program listings, be completely accurate, correct, reliable, or the most updated.
4.2 Notwithstanding the preceding Paragraph 4.1, when third party software is included in the Licensed Software, the warranty period and terms and conditions that apply shall be those established by the provider of the third party software.
4.3 When Yokogawa decides in its own judgement that it is necessary, Yokogawa may from time to time provide the Licensee with Revision upgrades and Version upgrades separately specified by Yokogawa (hereinafter called “Updates”).
4.4 Notwithstanding the preceding Paragraph 4.3, in no event shall Yokogawa provide Updates where the Licensee or any third party conducted renovation or improvement of the Licensed Software.
4.5 THE FOREGOING WARRANTIES ARE EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES OF QUALITY AND PERFORMANCE, WRITTEN, ORAL, OR IMPLIED, AND ALL OTHER WARRANTIES INCLUDING ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE ARE HEREBY DISCLAIMED BY YOKOGAWA AND ALL THIRD PARTIES LICENSING THIRD PARTY SOFTWARE TO YOKOGAWA.
4.6 Correction of nonconformity in the manner and for the period of time provided above shall be the Licensee’s sole and exclusive remedy for any failure of Yokogawa to comply with its obligations and shall constitute fulfillment of all liabilities of Yokogawa and any third party licensing the Third Party Software to Yokogawa (including any liability for direct, indirect, special, incidental or consequential damages) whether in warranty, contract, tort (including negligence but excluding willful conduct or gross negligence by Yokogawa) or otherwise with respect to or arising out of the use of the Licensed Software.

Article 5 (Infringement)
5.1 If and when any third party should demand injunction, initiate a law suit, or demand compensation for damages against the Licensee under patent right (including utility model right, design patent, and trade mark), copy right, and any other rights relating to any of the Licensed Software, the Licensee shall notify Yokogawa in writing to that effect without delay.
5.2 In the case of the preceding Paragraph 5.1, the Licensee shall assign to Yokogawa all of the rights to defend the Licensee and to negotiate with the claiming party. Furthermore, the Licensee shall provide Yokogawa with necessary information or any other assistance for Yokogawa’s defense and negotiation. If and when such a claim should be attributable to Yokogawa, subject to the written notice to Yokogawa stated in the preceding Paragraph 5.1, Yokogawa shall defend the Licensee and negotiate with the claiming party at Yokogawa’s cost and expense and be responsible for the final settlement or judgment granted to the claiming party in the preceding Paragraph 5.1.
5.3 When any assertion or allegation of the infringement of the third party’s rights defined in Paragraph 5.1 is made, or when at Yokogawa’s judgment there is possibility of such assertion or allegation, Yokogawa will, at its own discretion, take any of the following countermeasures at Yokogawa’s cost and expense.
  a) To acquire the necessary right from a third party which has lawful ownership of the right so that the Licensee will be able to continue to use the Licensed Software;
  b) To replace the Licensed Software with an alternative one which avoids the infringement; or
  c) To remodel the Licensed Software so that the Licensed Software can avoid the infringement of such third party’s right.
5.4 If and when Yokogawa fails to take either of the countermeasures as set forth in the preceding subparagraphs of Paragraph 5.3, Yokogawa shall indemnify the Licensee only by paying back the price amount of the Licensed Software which Yokogawa has received from the Licensee. THE FOREGOING PARAGRAPHS STATE THE ENTIRE LIABILITY OF YOKOGAWA AND ANY THIRD PARTY LICENSING THIRD PARTY SOFTWARE TO YOKOGAWA WITH RESPECT TO INFRINGEMENT OF THE INTELLECTUAL PROPERTY RIGHTS INCLUDING BUT NOT LIMITED TO, PATENT AND COPYRIGHT.

Article 6 (Liabilities)

6.1 If and when the Licensee should incur any damage relating to or arising out of the Licensed Software or service that Yokogawa has provided to the Licensee under the conditions herein due to a reason attributable to Yokogawa, Yokogawa shall take actions in accordance with this Agreement. However, in no event shall Yokogawa be liable or responsible for any special, incidental, consequential and/or indirect damage, whether in contract, warranty, tort, negligence, strict liability, or otherwise, including, without limitation, loss of operational profit or revenue, loss of use of the Licensed Software, or any associated products or equipment, cost of capital, loss or cost of interruption of the Licensee's business, substitute equipment, facilities or services, downtime costs, delays, and loss of business information, or claims of customers of Licensee or other third parties for such or other damages. Even if Yokogawa is liable or responsible for the damages attributable to Yokogawa and to the extent of this Article 6, Yokogawa's liability for the Licensee's damage shall not exceed the price amount of the Licensed Software or service fee which Yokogawa has received. Please note that Yokogawa shall be released or discharged from part or all of the liability under this Agreement if the Licensee modifies, remodels, combines with other software or products, or causes any deviation from the basic specifications or functional specifications, without Yokogawa's prior written consent.

6.2 All causes of action against Yokogawa arising out of or relating to this Agreement or the performance or breach hereof shall expire unless Yokogawa is notified of the claim within one (1) year of its occurrence.

6.3 In no event, regardless of cause, shall Yokogawa assume responsibility for or be liable for penalties or penalty clauses in any contracts between the Licensee and its customers.

Article 7 (Limit of Export)

Unless otherwise agreed by Yokogawa, the Licensee shall not directly or indirectly export or transfer the Licensed Software to any countries other than those where Yokogawa permits export in advance.

Article 8 (Term)

This Agreement shall become effective on the date when the Licensee receives the Licensed Software and continues in effect unless or until terminated as provided herein, or the Licensee ceases using the Licensed Software by itself or with Yokogawa's thirty (30) days prior written notice to the Licensee.

Article 9 (Injunction for Use)

During the term of this Agreement, Yokogawa may, at its own discretion, demand injunction against the Licensee in case that Yokogawa deems that the Licensed Software is used improperly or under severer environments other than those where Yokogawa has first approved, or any other condition which Yokogawa may not permit.

Article 10 (Termination)

Yokogawa, at its sole discretion, may terminate this Agreement without any notice or reminder to the Licensee if the Licensee violates or fails to perform this Agreement. However, Articles 5, 6, and 11 shall survive even after the termination.

Article 11 (Jurisdiction)

Any dispute, controversies, or differences between the parties hereto as to interpretation or execution of this Agreement shall be resolved amicably through negotiation between the parties upon the basis of mutual trust. Should the parties fail to agree within ninety (90) days after notice from one of the parties to the other, both parties hereby irrevocably submit to the exclusive jurisdiction of the Tokyo District Court (main office) in Japan for settlement of the dispute.

Article 12 (Governing Law)

This Agreement shall be governed by and construed in accordance with the laws of Japan. The Licensee expressly agrees to waive absolutely and irrevocably and to the fullest extent permissible under applicable law any rights against the laws of Japan which it may have pursuant to the Licensee's local law.

Article 13 (Severability)

In the event that any provision hereof is declared or found to be illegal by any court or tribunal of competent jurisdiction, such provision shall be null and void with respect to the jurisdiction of that court or tribunal and all the remaining provisions hereof shall remain in full force and effect.

Contents

Notes about Using This Software ii
How to Use This Manual iii
Software Versions That This Manual Applies To iv
Terms and Conditions of the Software License v

Chapter 1 Product Overrview
1.1 Explanation of Functions 1-1
1.2 PC System Requirements 1-7
1.3 Applicable Standards 1-8
1.4 Flow of Operation 1-11
1.5 Terminology Related to Flicker 1-13

Chapter 2 Preparation before Use
2.1 Connecting the WT and the PC 2-1
2.2 Setting the GP-IB Control 2-3
2.3 Setting the Ethernet Control 2-5
2.4 Installing the Software 2-7

Chapter 3 Starting and Using the Software
3.1 Starting the Software 3-1
3.2 Basic Operations 3-3

Chapter 4 Using the Start and Exit Pages
4.1 Selecting a Test Schedule Menu 4-1
4.2 Closing the Software 4-6

Chapter 5 Using the Open Page to Load Setting Information and Measured Data
5.1 Loading Setting Information and Measured Data 5-1

Chapter 6 Using the Connection Page to Establish a Connection between the PC and a WT
6.1 Establishing a New Connection Between the PC and a WT 6-1
6.2 Using the Connection Settings from a Loaded File 6-5
6.3 Using the Same Connection Settings as Before 6-6
6.4 Ending a Connection by Switching to Offline Mode 6-7

Chapter 7 Using the Setting Page to Configure Measurement and Judgment Conditions
7.1 Setting General Test Conditions 7-1
7.2 Setting the WT Measurement Conditions 7-4
7.3 Setting the WT Judgment Conditions 7-8

Chapter 8 Using the Measure Page to Make Measurements
8.1 Executing the Normal Voltage Fluctuation and Flicker Measurement 8-1
8.2 Executing the Measurement of dmax Caused by Manual Switching 8-10

Chapter 9 Using the Analysis Page to Display Judgment Results and Measured Data

9.1 Displaying Numerical Judgments 9-1
9.2 Displaying Trend Graphs 9-6
9.3 Displaying a CPF Graph 9-12

Chapter 10 Using the Print Page to Print Reports

10.1 Setting a Report's Title and Comments 10-1
10.2 Setting the Print Mode, Print Language and Output Form 10-4
10.3 Setting Print Details (Detail Setting) 10-5
10.4 Printing 10-6

Chapter 11 Using the Save Page to Save Setting Information and Measured Data

11.1 Saving Setting Information and Measured Data 11-1
11.2 Saving Measured Data as a Report in CSV Format 11-5

Chapter 12 Other Features

12.1 Cascading Windows 12-1
12.2 Tiling Windows 12-2
12.3 Using the Help Function 12-3
12.4 Viewing Version Information 12-5

Chapter 13 Troubleshooting

13.1 Troubleshooting 13-1
13.2 Error Messages 13-2

Chapter 14 Specifications

Specifications 14-1

Index

1.1 Explanation of Functions

This software application (761922) measures the voltage fluctuation and flicker of electrical equipment according to the IEC Standard (see section 1.3 for an overview) and indicates/saves the results of judgments made according to the standard.

Applicable Measurement Instruments

This software can be used with YOKOGAWA's measurement instruments listed below. This user's manual (IM761922-07E) describes the case when this software is used in combination with the WT3000. For information about the handling precautions, functions, and operating procedures of the WT3000 (hereinafter referred to as the WT), see the respective manuals.

Product	Model
WT3000	760301, 760302, 760303, and 760304

Applicable Standard

For the applicable standards, see section 1.3.

Setting Up Test Schedule Menus

You can arrange the following steps as you like to create custom test schedule menus.

Start: Select and edit test schedule menus.

Open: Load measured data and WT setting information files.

Connection: Configure the connection between the PC and a WT.

Setting: Set compatibility and measurement conditions.

Measure: Measure voltage fluctuation and flicker.

Analysis: Display measured results as bar and trend graphs.

Print: Print screen images and reports.

Save: Save measured data and setting information files.

Exit: Close the software.

You can start this software and then operate it according to the order of one of the test schedule menus. By designing appropriate menus, you can make the testing process smoother. You can also avoid forgetting and skipping steps when you have to repeat the same process over and over again.
Here are more details about each step:

Start

Use to select and edit test schedule menus. There are four preset standard test schedule menus available, in addition to custom test schedule menus that you can make yourself (located under the “User Setting” option button).

Open

Loading Measured Data Saved in the Past (Off-Line Mode)

The voltage fluctuation and flicker measurement data saved in the past can be loaded on the software. The software application shows the numeric data and judgment, trend graph view, and CPF graph view.* The software application can judge whether the measured data loaded offline conforms to the standard.

* Valid only for normal voltage fluctuation and flicker measurement.

Loading Setting Information

You can load setting information files that contain information such as measurement conditions, judgment conditions, and report titles and comments (reports contain information such as judgment results and lists of measured data values).

Connection

Use to connect the PC on which this software is installed to a WT through a GP-IB or Ethernet interface.

Setting

WT Measurement Conditions

Use to set WT measurement conditions such as the range to be measured and the line filter.

WT Judgment Conditions

Use to set the IEC 61000-3-3 voltage fluctuation and flicker measurement standards to be used for judgment.

Edition Settings for IEC 61000-4-15

IEC 61000-4-15 specifies requirements for measurement instruments. You can set the IEC edition from the following. This setting affects the flicker measurement parameters of the WT.

Edition No. of the IEC 61000-4-15	Flicker Measurement Parameters of the WT3000			
	50Hz		60Hz	
	230V	120V	120V	230V
Edition 1.1	Yes	No	Yes	No
Edition 2.0	Yes	Yes	Yes	Yes

For more details, see chapter 14.

Measure

Measurement Modes

There are two voltage and flicker measurement modes.

- **Normal Voltage Fluctuation and Flicker Measurement**
  In this mode, the software calculates all voltage and flicker values: dc, dmax, d(t), Pst, and Plt. It makes an overall judgment by comparing the calculated values with the set limits.
- **Measurement of dmax Caused By Manual Switching**
  The software measures the maximum relative voltage change, dmax, when the EUT (equipment under test) is turned ON and OFF manually. After the EUT has been turned ON and OFF 24 times, the software makes a judgment by comparing the average dmax with the set limit.

Measurement Items

- Rated voltage Un
- Voltage frequency Freq
- Relative steady-state voltage change dc
- Maximum relative voltage change dmax
- Period during which relative voltage change exceeds the threshold level d(t)
- Short-term flicker value Pst
- Long-term flicker value Plt
- Instantaneous flicker sensation IFS*
- Cumulative probability function CPF

* Displayed as PF on the trend graph

Starting/Stopping Measurements

You can start the voltage fluctuation and flicker measurement on the WT from your PC when in On-Line mode. The measurement cannot be started when in Off-Line mode.

During Normal Voltage Fluctuation and Flicker Measurement

If the measurement is started from your PC, the measured data of the normal voltage fluctuation and flicker measurement on the WT is retrieved and stored in your PC. When the measurement of an observation period is completed, the judgment result is displayed, and the measurement of the next observation period is started. When the specified count of measurements is completed, the measurement and data retrieval automatically stops. Then, the application displays the overall judgment result from the data measured during all observation periods and judgment results. You can also abort the measurement from the PC before the specified measurement count is reached.

During the Measurement of dmax Caused by Manual Switching

With this measurement method, you start the measurement from your PC, manually turn ON the EUT (Equipment under Test) switch, and turn OFF the switch before the measurement of an observation period (1 minute) is complete. The data of dmax caused by manual switching that the WT measures is retrieved and stored in your PC. When the measurement of an observation period is complete, the application enters the ready state. If you start the measurement again from your PC, the measurement of the next observation period is started. You can measure the selected observation period again if it is before the judgment. When 24 measurements are completed and you execute the judgment, the judgment result is displayed. You can also abort the measurement from the PC before the specified measurement count is reached. However, if you do, all the measured data and judgment results up to that point are discarded.

Analysis

Numeric Data and Judgment

The application can display the judgment result indicating whether the measured data of normal voltage fluctuation and flicker measurement or measurement of dmax caused by manual switching is within the specified limits as well as the measured data. The judgment can be displayed for each of the selected WT elements.

Trend Graph View

The application can display the trend graph of the normal voltage fluctuation and flicker measurement. The following parameters can be displayed: dc, dmax, d(t), idc, idmax, id(t), and PF.

CPF Graph View

The application can display the CPF graph of the normal voltage fluctuation and flicker measurement.

Print

You can attach comments and titles to a list of measured voltage fluctuation and flicker values and print and then save the list to .pdf or .bmp files or print the list as a report.

Save

Saving Setting Information

You can save setting information, such as measurement conditions, judgment conditions, and report titles and comments, to an .ini file (reports contain information such as judgment results and lists of measured data values.).

Saving Measured Data

You can use this software to save the measured data that the PC has acquired from the WT to an .fdt file. When you save a measured data file, an .ini setting information file is also saved.

Saving a Report in CSV Format

You can save report files in CSV format. This software cannot load CSV files, but you can use another program that can load CSV files to view the report data.

Exit

Use to close the software.

Online Mode and Offline Mode

Online Mode

The software is in online mode when the PC is connected to the WT through a GP-IB or Ethernet interface. The software must be in online mode to acquire voltage fluctuation and flicker data from the WT as it is measuring. You can switch to Online mode from the Connection page. In online mode, you can change the WT settings from the PC.

Offline Mode

You can load previously saved measured voltage fluctuation and flicker data into the software. You can use the loaded data to display numerical judgments, trend graphs,* and CPF graphs.*

* Valid with general voltage fluctuation and flicker measurement.

1.2 PC System Requirements

PC

CPU
Pentium 4 1.5 GHz or higher (recommended)

Memory
1 GB or more (recommended)

Hard Disk
500 MB or more of free space

Operating System
Microsoft Windows XP, Windows Vista[1], or Windows 7[1].

1 Both 32-bit versions and 64-bit versions are supported.

Communication Card
GP-IB
One of the following GPIB boards or cards by National Instruments.

You will need the driver version that is listed below for your OS or a later version (NI-488.2).

	PCI-GPIB	PCI-GPIB+	PCMCIA-GPIB	PCMCIA-GPIB+	GPIB-USB-HS
Windows XP	1.60[2]	1.60[2]	1.60[2]	1.60[2]	2.8.1
Windows Vista	2.7.2	2.7.2	not supported	not supported	2.8.1
Windows 7	2.7.2	2.7.2	not supported	not supported	2.8.1

2 However, version 2.3 is not supported.

Ethernet
A 100BASE-TX Ethernet port.

Display, Printer, and Mouse
Must be compatible with the operating systems listed above.

WT3000
WT3000 firmware version 4.01 or later with the following functions.

- Flicker measurement function (/FL option)
- GP-IB interface (standard) or Ethernet interface (/C7 option)

How Different WT3000 Firmware Versions Handle IEC 61000-4-15
In WT3000 firmware versions 5.21 and later, you can select the IEC 61000-4-15 edition.

Edition No. of the IEC 61000-4-15
- Edition 1.1
- Edition 2.0

IEC 61000-4-15 specifies requirements for measurement instruments. For details, see chapter 14. In WT3000 firmware versions 4.01 to 5.20, the edition is fixed at IEC 61000-4-15 edition 1.1.

1.3 Applicable Standards

The software application supports the following standards.

Voltage Fluctuation and Flicker Suppression Standards

- IEC 61000-3-3 Edition 2.0:2008
- EN 61000-3-3:2008

Flicker Meter Function and Design Specifications

- IEC 61000-4-15 Edition 1.1:2003, IEC 61000-4-15 Edition 2.0:2010
- EN 61000-4-15:1998, EN 61000-4-15A1:2003, EN 61000-4-15:2011

This section gives an overview of the standards. For further details, see the actual text of the applicable standard.

Scope

The limits of the IEC61000-3-3 Voltage Fluctuation and Flicker Suppression Standard are applicable to electrical and electronic equipment having an input current up to and including 16 A per phase and intended to be connected to public low-voltage distribution systems of between 220 V and 250 V at 50 Hz line to neutral.

Limits

IEC 61000-3-3 Edition 2.0 specifies limits for a phase voltage of 230 V and a frequency of 50 Hz.

Note

The software supports the specifications of flicker meters for 230 V and 50 Hz in IEC 61000-4-15 Edition 1.1 as well as those for 120 V and 60 Hz. For edition 2.0, 230 V/60 Hz and 120 V/50 Hz are additionally supported. However, IEC 61000-3-11 does not define limits for 120 V/60 Hz, 230 V/60 Hz, or 120 V/50 Hz.

Measurement Items and Limits in IEC 61000-3-3 Edition 2.0

Measurement Item	Limit
Relative steady-state voltage change dc	3.3% or less
Maximum relative voltage change dmax	4% or less (no conditions)* 6% or less (condition 1)* 7% or less (condition 2)*
Period during which relative voltage change exceeds 3.3% d(t)	500 ms or less
Short-term flicker value Pst	1.0 or less
Long-term flicker value Plt	0.65 or less

* For the conditions, see the figure below.

Conditions for the Limit on Maximum Relative Voltage Change dmax

No conditions

- **Devices that are not classified in condition 1 or 2**

Condition 1

- **Manual switching device**
- **Automatic switching devices that are estimated to switch OFF and ON more than two times per day that restart with a delay (delay of 20 to 30 s or more) after a power failure or devices that require manual restarting.**

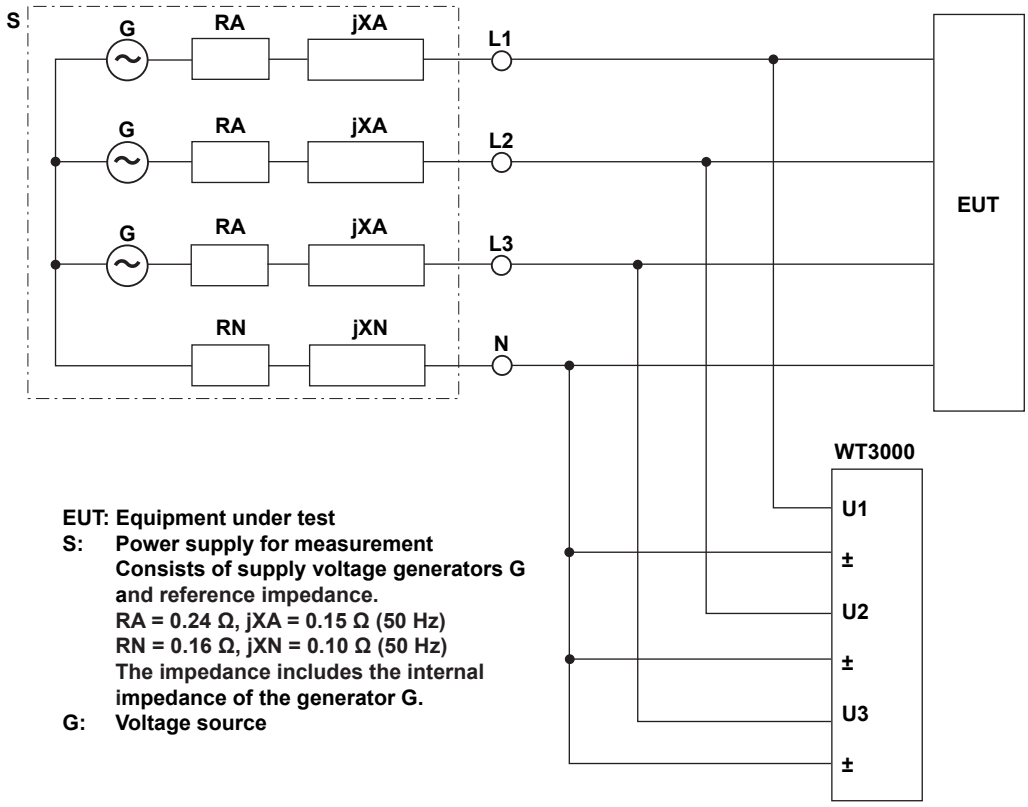
Condition 2

- **Devices held by human hand (examples: hair driers, vacuum cleaners, cooking appliances such as a mixer, lawn mowers, portable tools such as a electric drill)**
- **Automatic switching devices that are estimated to switch two or less times per day or manual switching devices, which restart with a delay (delay of 20 to 30 s or more) after a power failure or require manual restarting.**

Note

- The Pst and Plt limits are not applicable to the voltage fluctuation due to manual switching.
- The limits are not applicable to switching and interruptions in an emergency.
- The limits are not applicable on some measurement items depending on the EUT type.

Wiring for Voltage Fluctuation and Flicker Measurement



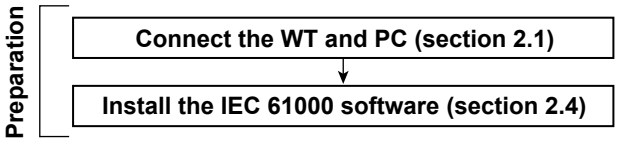
EUT: Equipment under test
S: Power supply for measurement
Consists of supply voltage generators G and reference impedance.
RA = 0.24 Ω, jXA = 0.15 Ω (50 Hz)
RN = 0.16 Ω, jXN = 0.10 Ω (50 Hz)
The impedance includes the internal impedance of the generator G.
G: Voltage source

L2 and L3 are not connected if the wiring system is single-phase, two-wire.

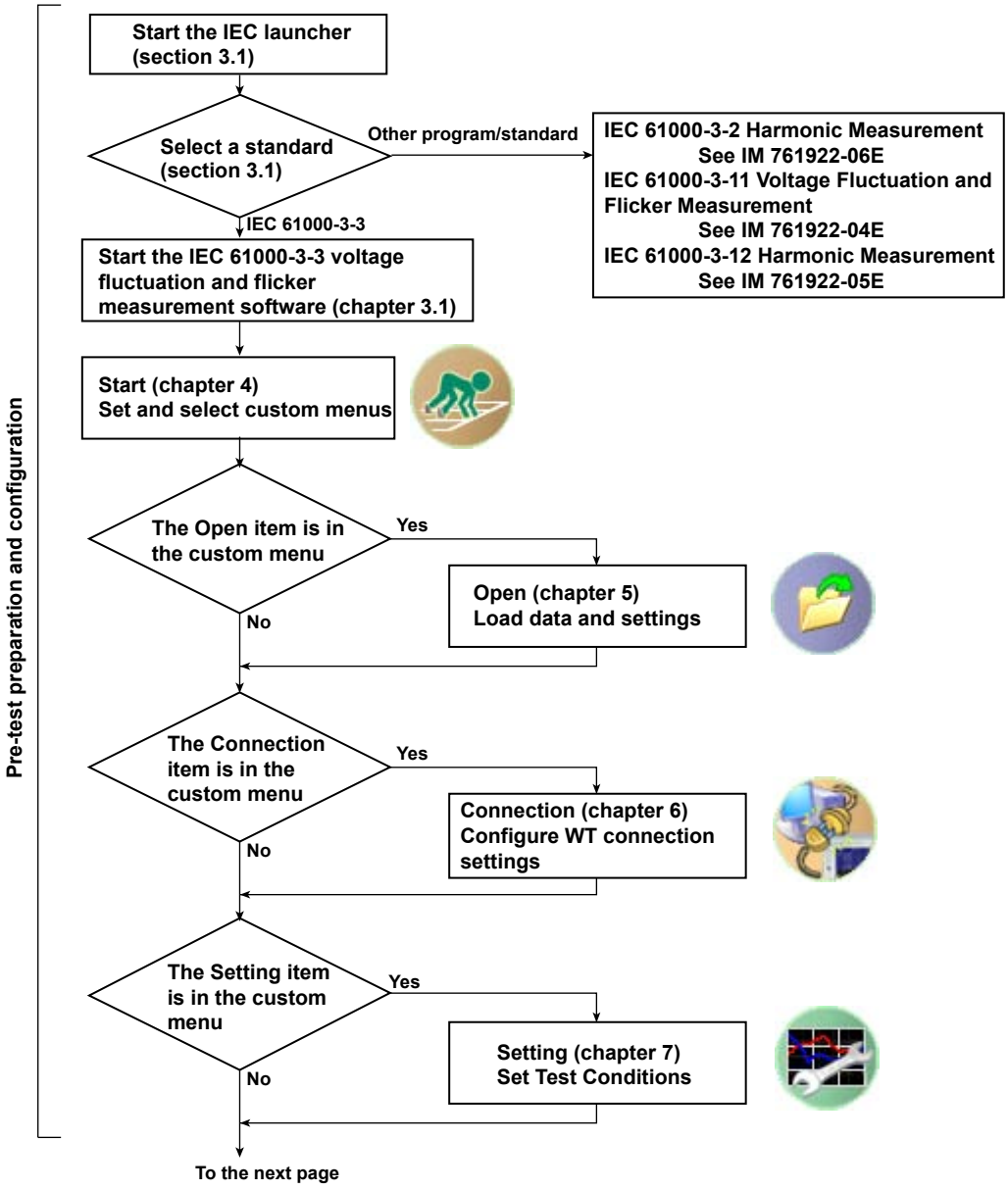
1.4 Flow of Operation

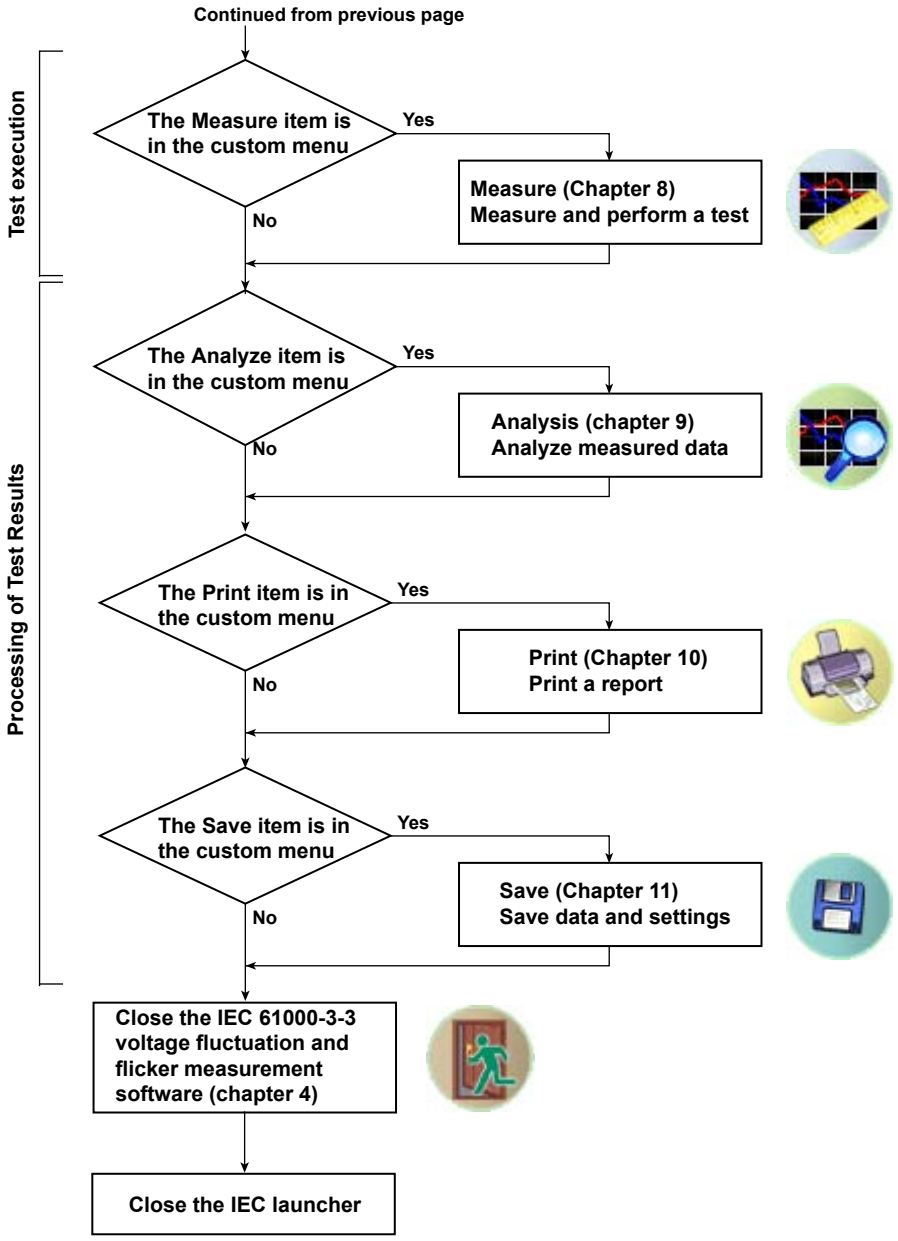
To display and judge the voltage fluctuation and flicker measurement data using this software, the WT and PC must be connected, the software must be installed, WT measurement conditions must be set, and judgment conditions of the applicable standard must be set. Follow the steps below.
There are two methods for connecting the PC and the WT: GP-IB and Ethernet (option).

Preparation Flow Chart



Test Flowchart




Continued from previous page
Test execution
Processing of Test Results
The Measure item is in the custom menu
Yes
No
Measure (Chapter 8)
Measure and perform a test
The Analyze item is in the custom menu
Yes
No
Analysis (chapter 9)
Analyze measured data
The Print item is in the custom menu
Yes
No
Print (Chapter 10)
Print a report
The Save item is in the custom menu
Yes
No
Save (Chapter 11)
Save data and settings
Close the IEC 61000-3-3 voltage fluctuation and flicker measurement software (chapter 4)
Close the IEC launcher

1.5 Terminology Related to Flicker

Flicker

Flicker refers to the unstable impression perceived by the human eye that is induced by the fluctuating intensity or spectral distribution of light. It expresses the irritation that the people receive due to the fluctuation of brightness.

Steady-state Condition

A condition in which the rms voltage per half period is stable for 1 s or more.

Relative Steady-State Voltage Change dc

A value obtained by dividing the difference between two steady-state voltages before and after a single voltage fluctuation by the rated voltage expressed as a percentage. For example, for a power supply with a rated voltage of 230 V, the relative steady-state voltage change is as shown below if the steady-state voltage before the fluctuation is 231 V and that after the fluctuation is 232 V.

$$\left|\frac{232-231}{230}\right| \times 100(\%) = 0.43\%$$

Note

- If no voltage fluctuation occurs on the WT3000 in the measurement period, dc is zero.
- If a steady-state condition does not occur during the measurement period on the WT3000, it is considered to be a fluctuating condition. The measured value of dc is displayed as Undef (undefined, Ed1.1) or 0 (Ed2.0), and the judgment is displayed as Error (Ed1.1) or Pass (Ed2.0).

Maximum Relative Voltage Change dmax

- **For Ed1.1**
  A value obtained by dividing the difference between the maximum and minimum values in a single voltage fluctuation* by the rated voltage expressed as a percentage.
- **For Ed2.0**
  The absolute value of the difference between the maximum value and the value in the previous steady-state condition is compared with the absolute value of the difference between the minimum value and the value in the previous steady-state condition in a single voltage fluctuation.* dmax is the value obtained by dividing the larger of the two values by the rated voltage expressed as a percentage.

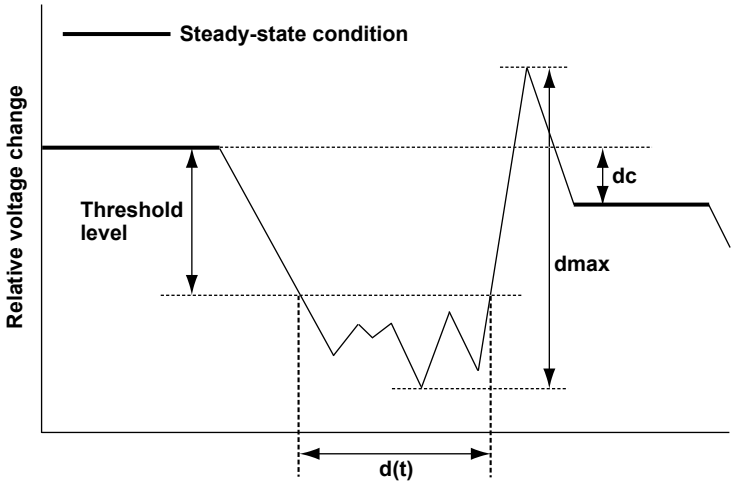
* Condition between two steady-state conditions.

Period during Which Relative Voltage Change Exceeds the Threshold Level d(t)

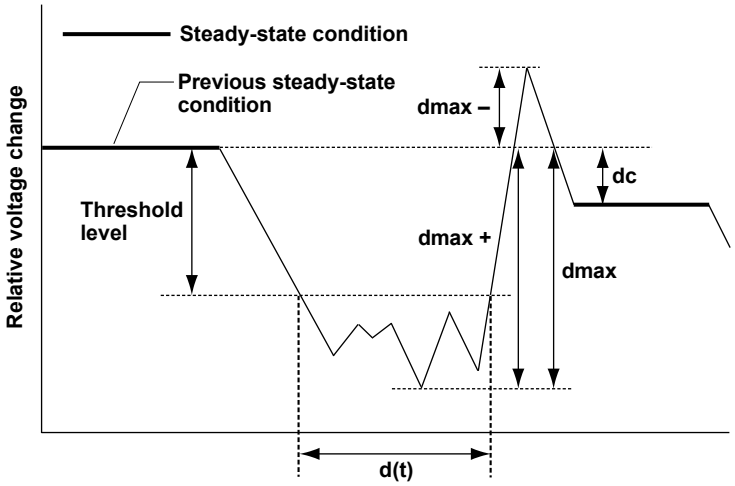
The time during which the relative voltage change during a voltage fluctuation period exceeds the threshold level.

Relationship between dc, dmax, and d(t)

- **For Ed1.1**



- **For Ed2.0**



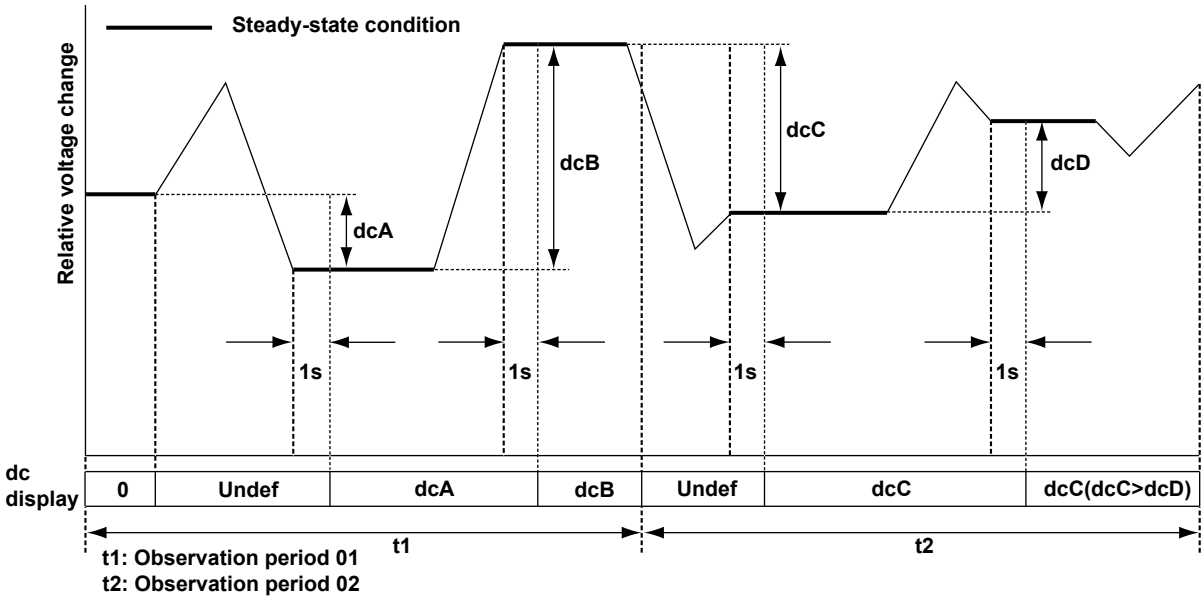
dmax +: The difference between the minimum value and the value in the previous steady-state condition

dmax –: The difference between the maximum value and the value in the previous steady-state condition

dmax: The larger of the absolute values of dmax + and dmax –

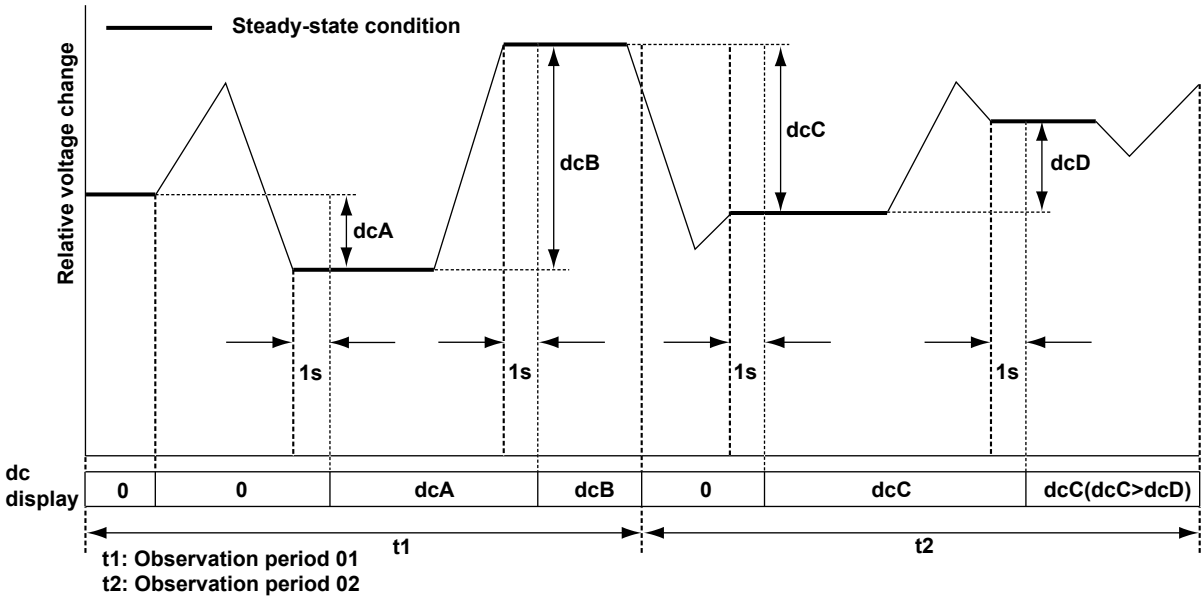
Display Example of dc

- **For Ed1.1**



t1: Observation period 01
t2: Observation period 02

- **For Ed2.0**



t1: Observation period 01
t2: Observation period 02

Short-Term Flicker Value Pst

The method using the flicker meter is standard in IEC 61000-3-3. For details on the flicker meter, see IEC 61000-4-15. The normal observation period of Pst is 10 minutes.

Long-Term Flicker Value Plt

The long-term flicker value is normally determined from 12 Pst values using the equation below. The normal observation period is 2 hours.

$$Plt = \sqrt[3]{\frac{Pst_1^3 + Pst_2^3 + \cdots + Pst_{12}^3}{12}}$$

Pst_1 :Pst of the 1th 10 minutes

Pst_2 :Pst of the 2th 10 minutes

:

Pst_{12} :Pst of the 12th 10 minutes

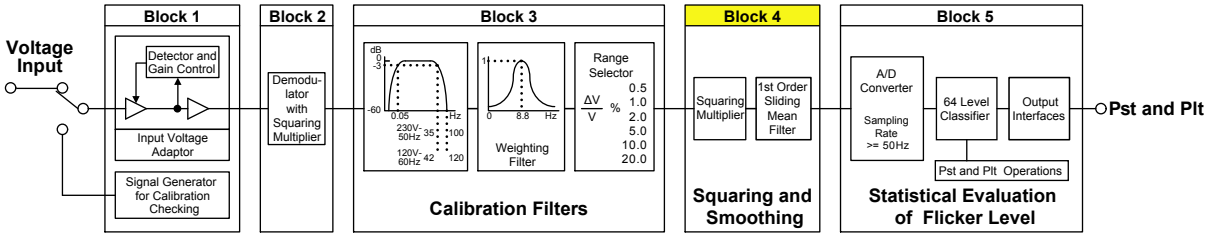
Note

If the number of observation periods is less than constant N (12) in the Plt equation, the Pst values that are not observed are computed as 0.0.

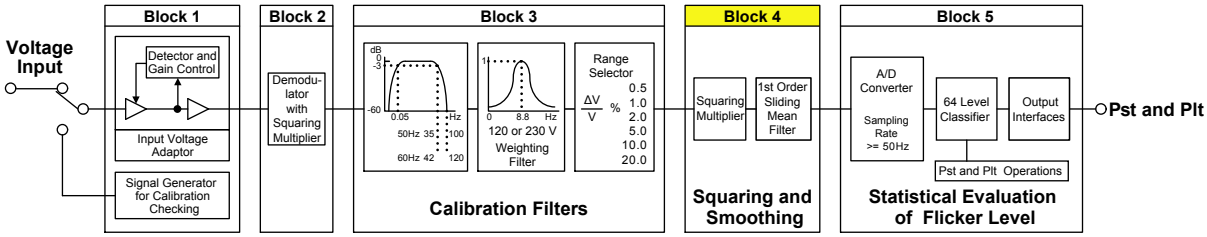
Instantaneous Flicker Sensation IFS

The output of block 4 of the flicker meter. For details on the flicker meter, see IEC 61000-4-15.

Block Diagram of the Flicker Meter in IEC 61000-4-15 Edition 1.1



Block Diagram of the Flicker Meter in IEC 61000-4-15 Edition 2.0



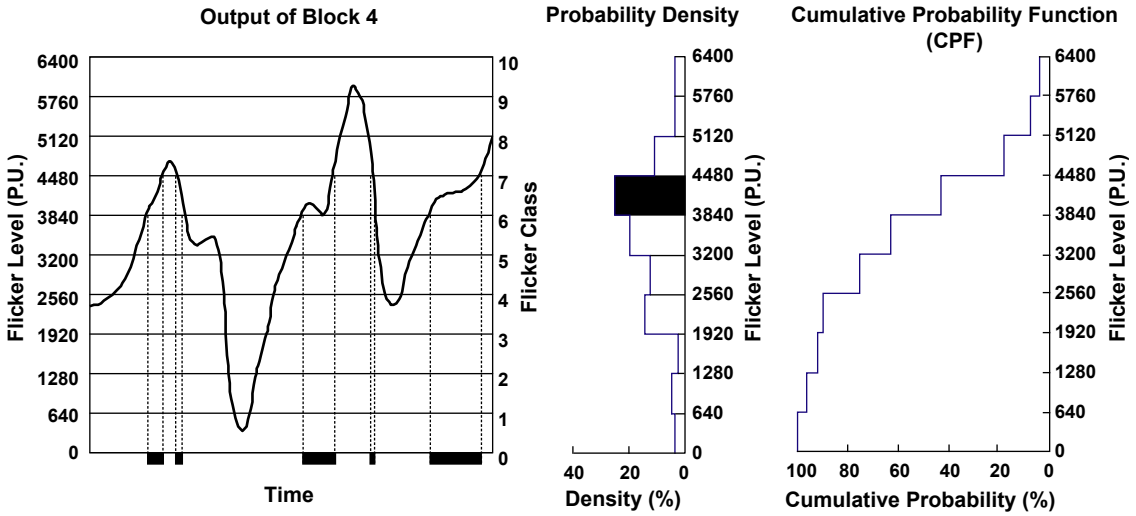
Note

This method does not necessarily match the processing method of the WT3000.

Cumulative Probability Function CPF

This function determines the probability density function of the flicker level from the instantaneous flicker sensation and accumulates the levels of the function from the highest level.

Example in Which Flicker Levels 0 to 6400 [P.U] Are Divided into 10 Flicker Classes



Note

The WT3000 performs processing different from the figure above to compute the CPF more accurately.

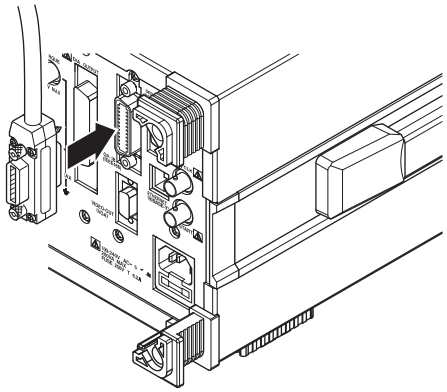
2.1 Connecting the WT and the PC

CAUTION

When connecting or disconnecting communication cables, make sure to turn OFF the PC and the WT. Otherwise, erroneous operation or damage to the internal circuitry may result.

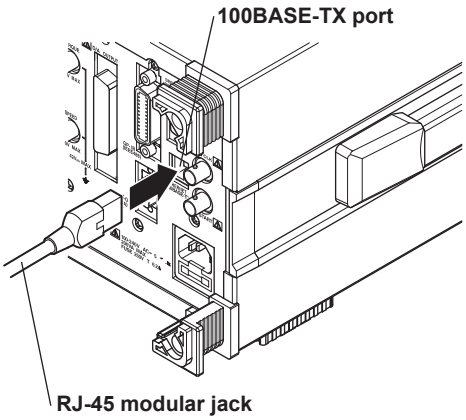
When Controlling the WT through the GP-IB

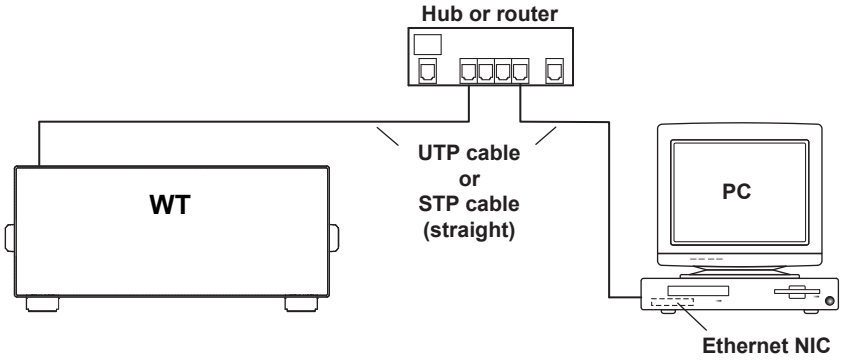
The GP-IB available on the WT is a 24-pin connector that conforms to the IEEE St'd 488-1978. Use a GP-IB cable that conforms to this standard. Connect the cable to the GP-IB connector on the rear panel of the WT. For details on the connection procedure and the specifications of the GP-IB interface, see the *WT3000 Communication Interface User's Manual IM760301-17E* on the CD-ROM. Use an appropriate connector for your PC to connect the other end of the GP-IB cable.



When Controlling the WT through the Ethernet Interface

Connect the WT and your PC through a hub using straight UTP (Unshielded Twisted-Pair) or STP (Shielded Twisted-Pair) cables. Connect the cable to the ETHERNET port on the rear panel of the WT. Use hubs, cables, and Ethernet NIC that are appropriate for the data rate. For details on the connection procedure and the specifications of the Ethernet interface, see the *Expansion Function User's Manual IM760301-51E* of the WT3000 and the *WT3000 Communication Interface User's Manual IM760301-17E* on the CD-ROM.





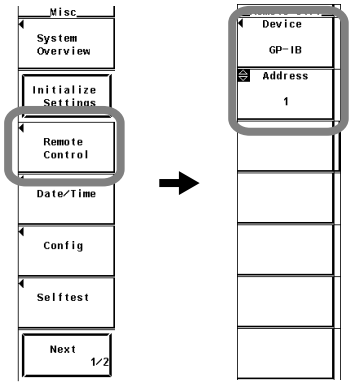
Note

- Use UTP (Unshielded Twisted-Pair) or STP (Shielded Twisted-Pair) cables of category 5 or better when connecting to a 100BASE-TX network.
- Do not directly connect the WT to the PC without using a hub. Operations are not guaranteed for communications using direct connection.

2.2 Setting the GP-IB Control

Procedure

1. Press **MISC** to display the Misc menu.
2. Press the **Remote Control** soft key to display the Remote Ctrl menu.
3. Press the **Device** soft key to select GP-IB.
   Only the communication interface selected here is enabled. The WT does not accept commands that are transmitted to other unselected communication interfaces.
4. Press the **cursor keys** to set the address.



Explanation

To use the software in On-Line mode through the GP-IB interface, operate the WT to select GP-IB.

Setting the Address

Set the WT address within the following range.
1 to 30

Each device that can be connected via GP-IB has a unique address within the GP-IB system. This address is used to distinguish the device from others. Therefore, make sure that the WT address does not overlap with other devices when connecting the WT to the PC.

Note

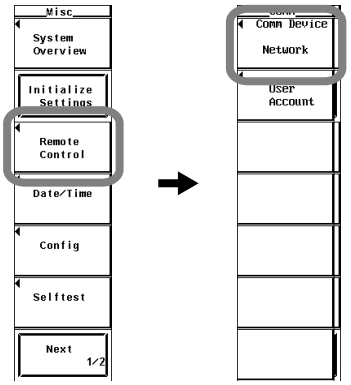
- Do not change the address while the controller (PC) or other devices are using the GP-IB system.
- When connecting the WT to a single PC and controlling the WT using this software, multiple communication interfaces cannot be used simultaneously.
- Use a GP-IB card by National Instruments on the PC end. For details, see section 1.2.
- The software may not operate correctly, if an adapter is inserted in the middle of the connection between the WT and the PC (for example, GP-IB-to-USB adapter). For details, contact your nearest YOKOGAWA dealer.

2.3 Setting the Ethernet Control

Procedure

Setting the Ethernet Interface

1. Press **MISC** to display the Misc menu.
2. Press the **Remote Control** soft key to display the Remote Ctrl menu.
3. Press the **Device** soft key to select Network.
   Only the communication interface selected here is enabled. The WT does not accept commands that are transmitted to other unselected communication interfaces.



Setting the User Name and Password

4. Press the **User Account** soft key to display the User Account dialog box.
5. Press the **cursor keys** to select User Name.
6. Press **SET** to display the keyboard.
7. Use the **keyboard** on the WT to enter the user name.
   For the keyboard operation of the WT, see the WT User's Manual.
8. Press the **cursor keys** to select Password.
9. Press **SET** to display the keyboard.
10. Use the **keyboard** on the WT to enter the password.
    Enter the password twice for confirmation.
    A password is not required if the login name is anonymous.
    For the keyboard operation of the WT, see the WT User's Manual.

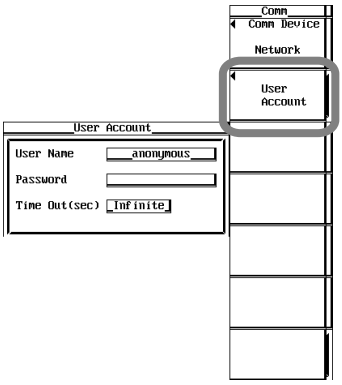
Setting the Timeout Value

11. Press the **cursor keys** to select Time Out.

12. Press **SET** to display the timeout time selection box.

13. Press the **cursor keys** to set the timeout value.

14. Press **SET** or **ESC** to close the box.



Setting TCP/IP

You must enter TCP/IP settings to control the WT from a PC through the network. For the setup procedure, see the *Expansion Function User's Manual IM760301-51E* of the WT3000.

Explanation

To use the software in On-Line mode through the network, operate the WT to select Network.

Setting the User Name

- Enter the user name to allow access to the WT.
- Enter up to 15 characters.
- The characters that can be used are 0-9, A-Z, %, _, ( ) (parentheses), - (minus sign).
- If you specify anonymous, the WT can be accessed from the PC without a password.

Setting the Password

- Enter the password of the user name to allow access to the WT.
- Enter up to 15 characters.
- The characters that can be used are 0-9, A-Z, %, _, ( ) (parentheses), - (minus sign).
- If you set the user name to anonymous, the WT can be accessed from the PC without a password.

Setting the Timeout Value

The WT closes the connection to the network if there is no access for a certain period of time (timeout value).
The available settings are 1 to 3600 s, or Infinite. The default value is Infinite.

Note

- To activate the settings, you must power cycle the WT.
- When connecting the WT to a single PC and controlling the WT using this software, multiple communication interfaces cannot be used simultaneously.
- The software may not operate correctly, if an adapter is inserted in the middle of the connection between the WT and the PC (for example, GP-IB-to-USB adapter). For details, contact your nearest YOKOGAWA dealer.

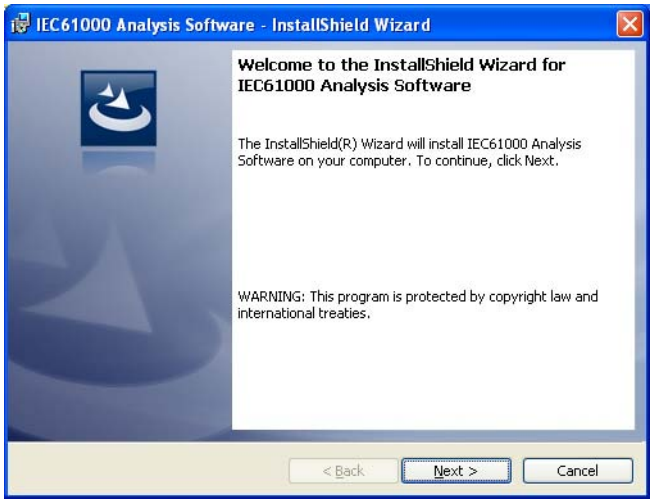
2.4 Installing the Software

Procedure

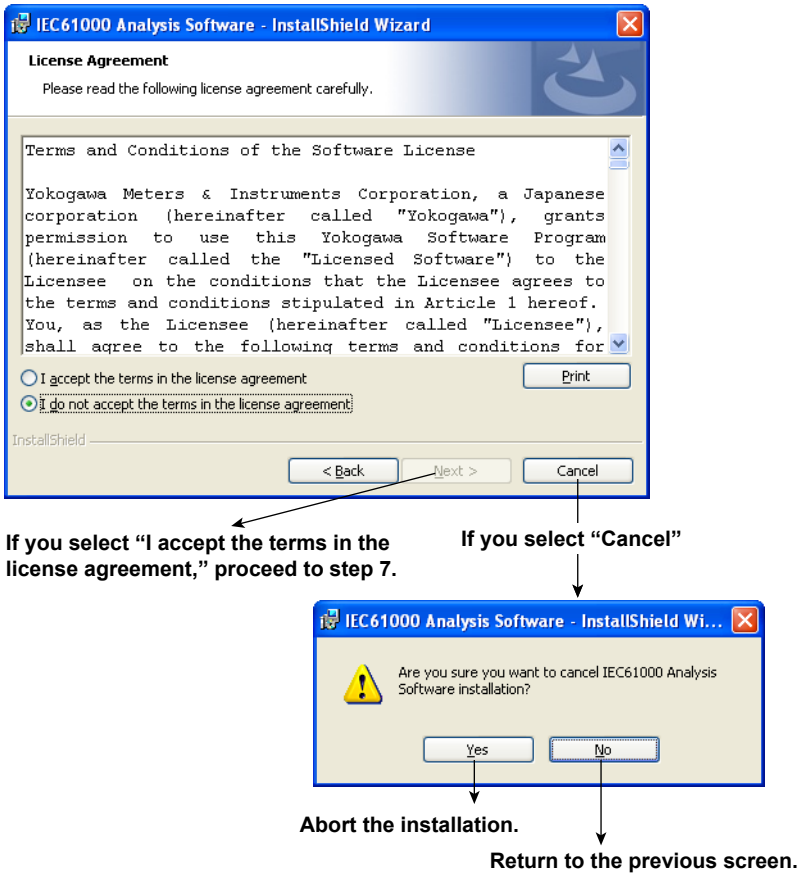
Have the CD-ROM containing the software ready. Exit all programs that are currently running before starting the installation. If an older version of the Harmonic/Flicker Measurement Software is installed, uninstall it first.
The following procedures are for installing the software on Windows XP. The screens shown in the figure may vary depending on the OS that is running on the PC.

1. Start Windows.
   Set the user name to Administrator when starting up.
2. Place the installation CD-ROM containing the software into the CD-ROM drive.
3. Double-click My Computer, then the CD-ROM icon.
4. Double-click **Setup**. InstallShield Wizard starts.

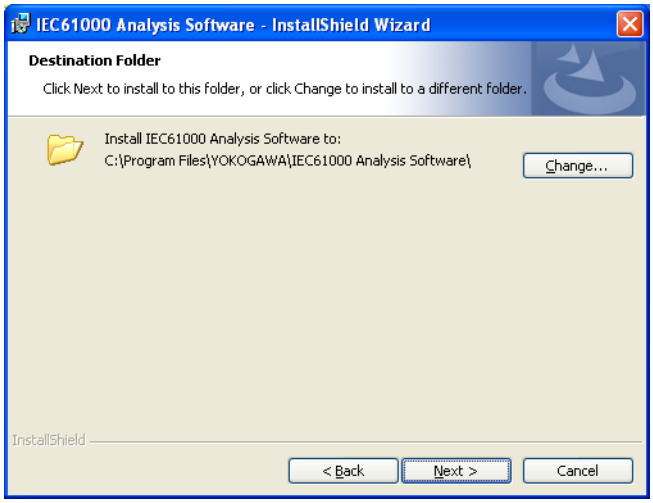
5. Click **Next**.



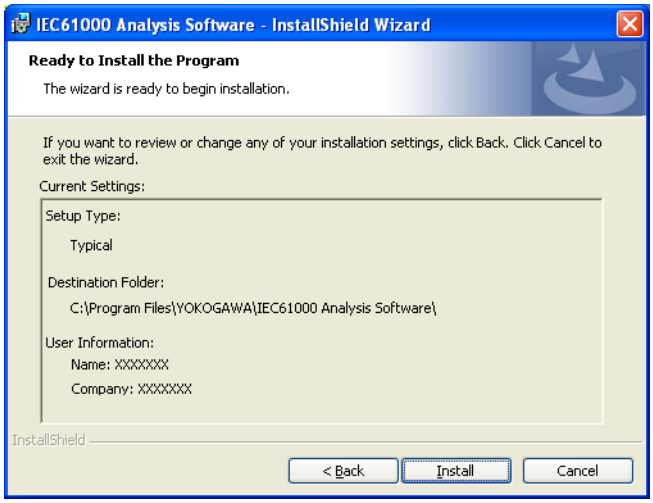
6. If you accept the terms of with the license agreement, select **"I accept the terms in the license agreement"**, and click **Next**. If you do not, select **Cancel**.



7. Select the installation destination, and click **Next**.
Click Change to specify the installation destination. The default installation destination is set to "C:¥Program Files¥Yokogawa¥IEC61000 Analysis Software."



8. Click **Install**. The installation starts.



9. If the PC's OS is Windows Vista or Windows 7, the User Account Control screen will appear part way through the installation. Click **Yes** to continue with the installation.

10. If the installation completes successfully, the following message is displayed. Click **Finish**.

The program icon (shortcut) of the software is added in the program menu of the Start menu. The program folder is Yokogawa.

Uninstalling the Software

The procedure below is for uninstalling the software program on Windows XP.

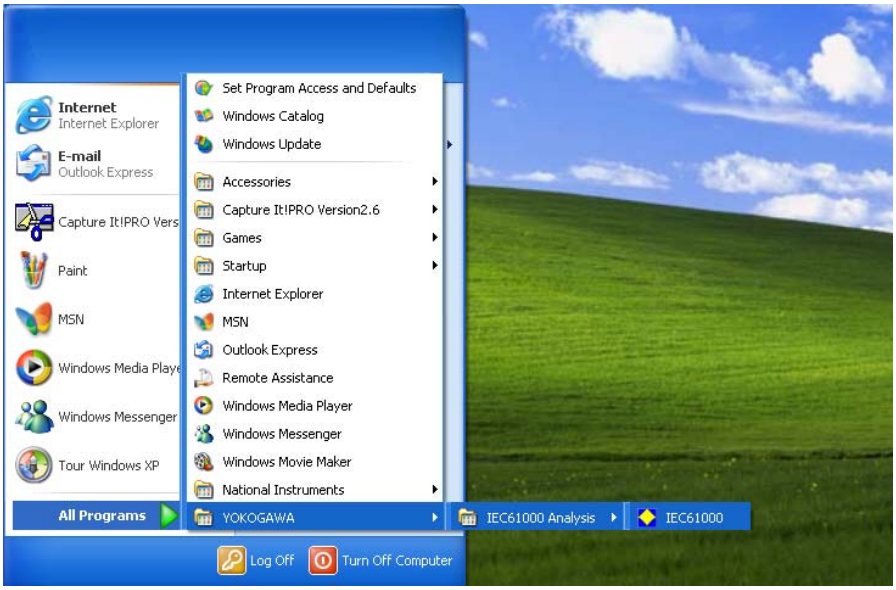
1. On the task bar, click the Start button and choose Control Panel.
2. Double-click **Add or Remove Programs** from the Control Panel.
3. Select **IEC61000 Analysis Software** in the Add or Remove Programs window and click **Remove**.
4. A confirmation dialog box for removing the program opens. Click **Yes** to delete the program. Clicking **No** will cancel the removal operation.
5. The software program is uninstalled.
6. If the PC's OS is Windows Vista or Windows 7, the User Account Control screen will appear part way through the uninstallation. Click **Yes** to continue with the uninstallation.

3.1 Starting the Software

Procedure

Starting the Software

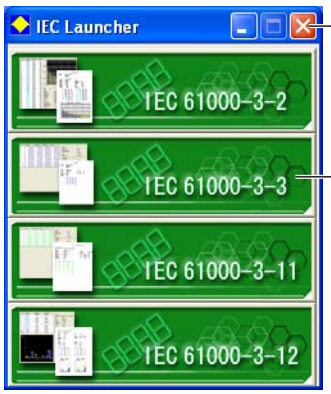
1. From the **Start** menu, choose **All Programs** > **YOKOGAWA** > **IEC61000 Analysis** > **IEC61000**.
   The procedure above applies when the default software installation destination and program folder are used.
   If you changed the installation destination or program folder at installation, select the corresponding location.



The IEC Launcher appears. Use it to select the appropriate standard.

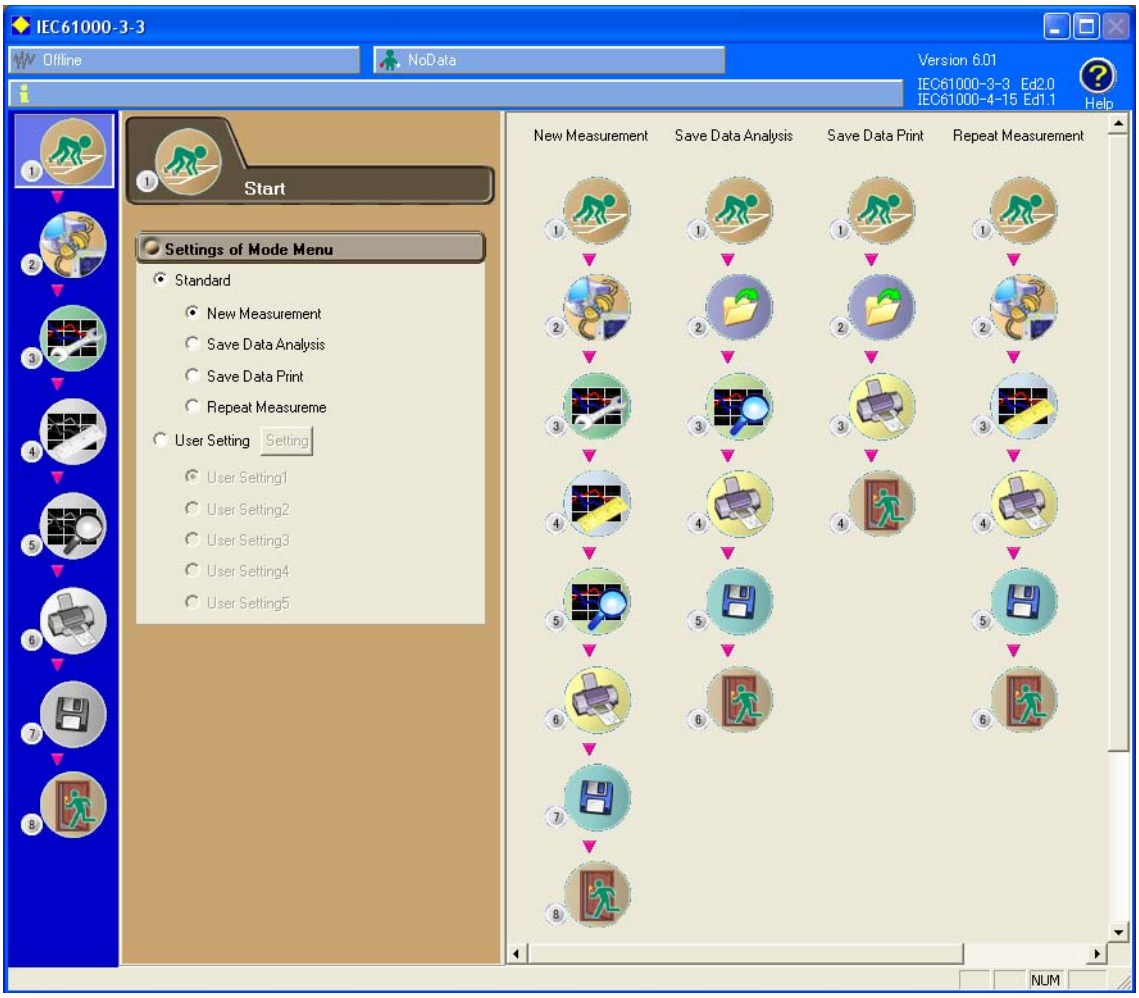
Selecting a Standard

2. Select **IEC61000-3-3** to open the IEC 61000-3-3 voltage fluctuation and flicker measurement software.



Closes the IEC launcher

Starts the IEC 61000-3-3 voltage fluctuation and flicker measurement software



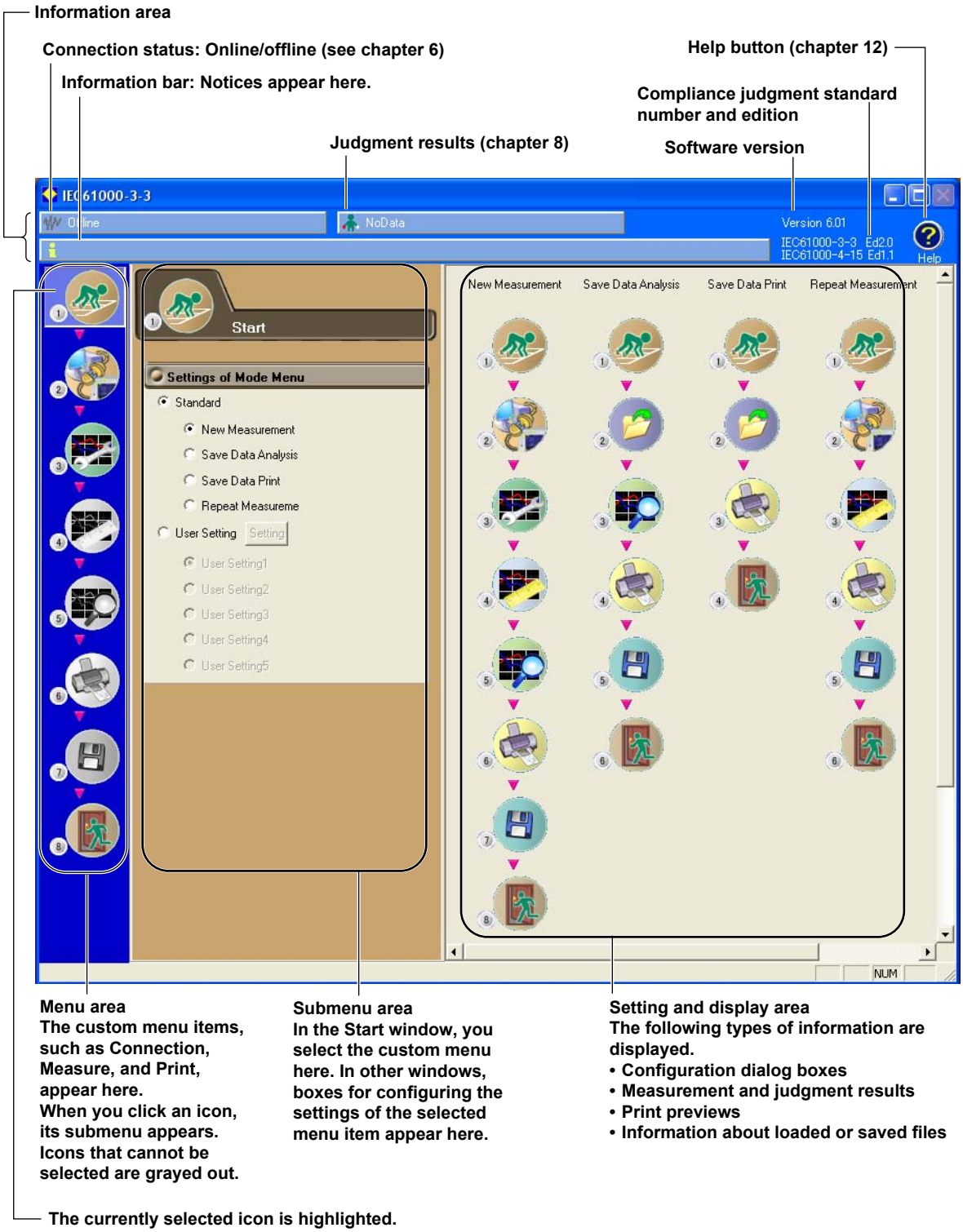
Explanation

You can start this software by accessing its shortcut from the start menu's program folder. This software is installed in the location that you specified in the previous chapter.

Selecting a Standard

To measure the voltage fluctuation and flicker of a device with an electric current not greater than 16 A, select IEC 61000-3-3. The voltage fluctuation and flicker measurement software will start. If you select a different standard, the program that corresponds to that standard will start. For information about the programs that correspond to other standards, see their user's manuals (the help function, see section 12.3).

3.2 Basic Operations



Menu Area Icons

Start
Use to select and edit test schedule menus. There are four preset standard test schedule menus available, in addition to custom test schedule menus that you can make yourself (located under the “User Setting” option button).

Open
Use to open the following kinds of files:
• Setting information files that contain information such as measurement conditions and judgment conditions.
•Measured data files that contain measured data acquired by the PC from a WT.

Connection
Use to connect the PC to the WT through a GP-IB or Ethernet interface.

Setting
Use to set measurement and judgment conditions.

Measure
Use to measure voltage fluctuation and flicker. There are two measurement modes.
• Normal voltage fluctuation and flicker measurement (General mode)
• Measurement of dmax caused by manual switching (Manual dmax mode)

Analysis
Use to display measured results in one of the following formats.
• Numerical judgment
• Trend graph
• CPF graph

Print
You can attach comments and titles to a list of measured values and print the list as a report.

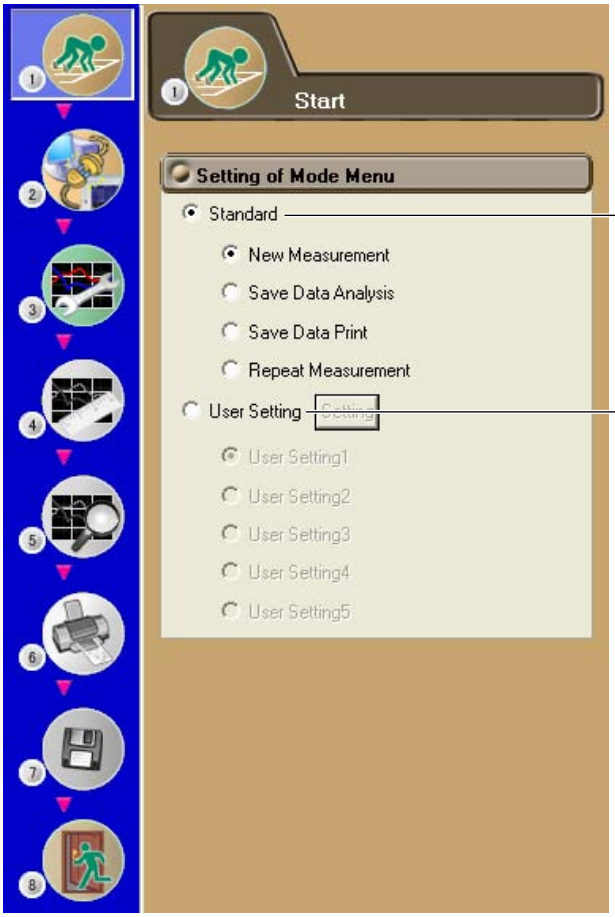
Save
Use to save the following kinds of files.
• Setting information files that contain information such as measurement conditions and judgment conditions.
• Measured data files that contain measured data acquired by the PC from a WT.
• CSV files that contain numerical judgment, trend, and CPF data.

Exit
Use to close the software.

4.1 Selecting a Test Schedule Menu

Procedure

1. Select the icon in the menu area. The Start submenu appears.

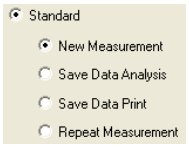


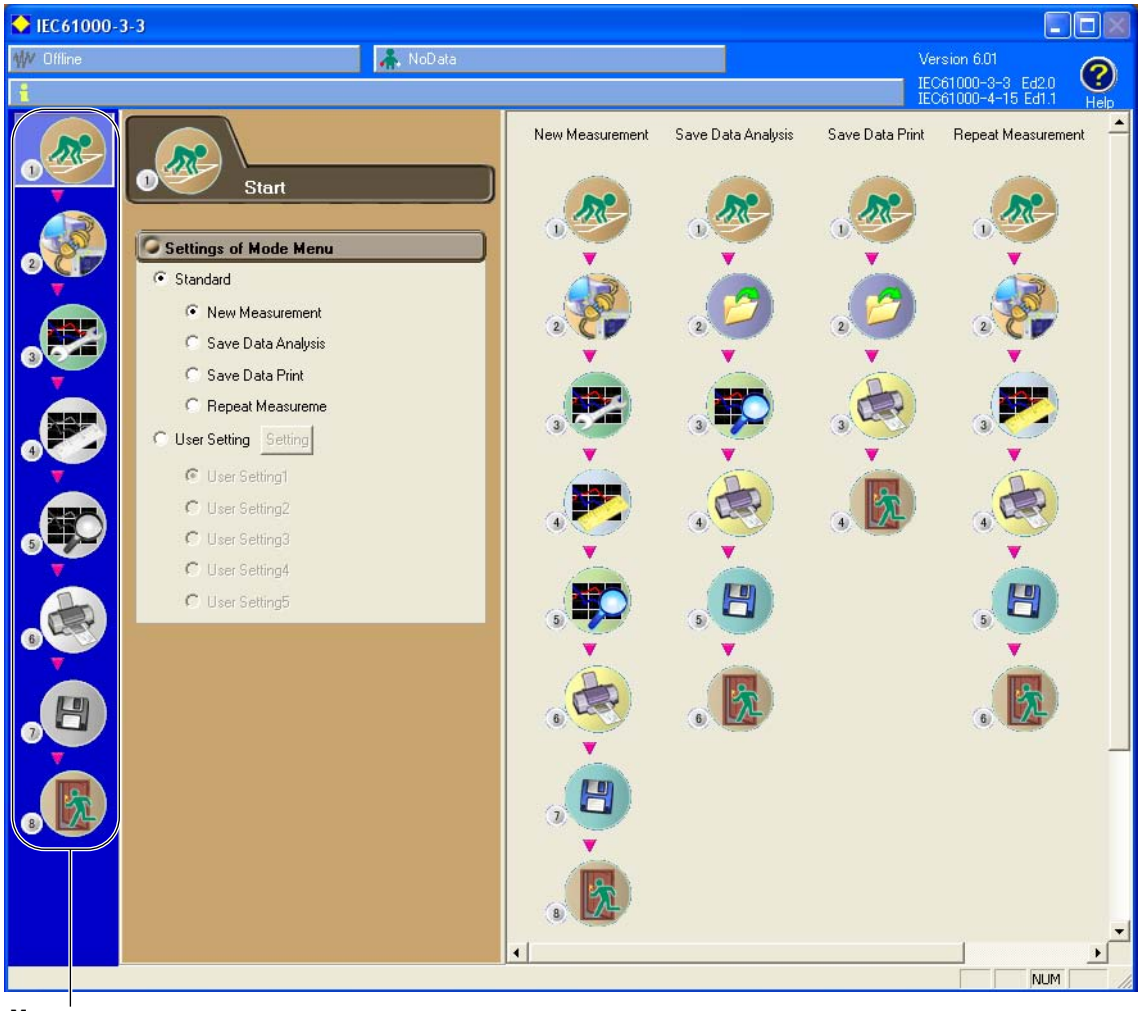
Standard (page 4-2)
There are four standard menus.

User Setting (page 4-3)
You can select and edit specific custom test schedule menus.

Selecting One of the Standard Test Schedule Menus

2. Click **Standard**.
3. Select one of the following test schedule menus. The icons representing the steps that are included in the menu that you select will appear in the menu area on the left.
   - New Measurement
   - Save Data Analysis
   - Save Data Print
   - Repeat Measurement

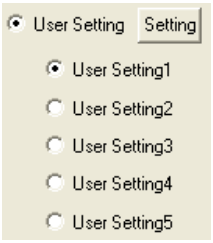


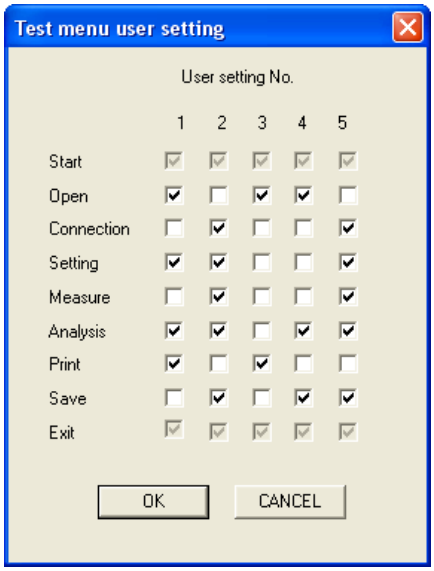


Menu area
The icons of the custom menu that you select appear.

Creating Your Own Custom Test Schedule Menu (User Setting)

2. Click **User Setting**.
3. Click **Setting**. The menu customization dialog box opens (the dialog box is labeled “Test menu user setting”).
4. Use the check boxes to select the steps that you want to include in each of the five custom test schedule menus (labeled as “User Setting” 1 to 5 in the start window).
5. Click **OK**.
6. Select the custom test schedule menu that you want to use from “User Setting” 1 to 5. The icons representing the steps that are included in the custom test schedule menu that you select will appear in the menu area on the left.





Explanation

Selecting a Test Schedule Menu

A test schedule menu lays out the overall test structure. You can choose from test schedule menus that contain different combinations of the following 9 steps. For more information on each step, see section 1.1.

Start: Select and edit test schedule menus.

Open: Load measured data and WT setting information files.

Connection: Configure the connection between the PC and a WT.

Setting: Set compatibility and measurement conditions.

Measure: Measure voltage fluctuation and flicker.

Analysis: Display measured results as bar and trend graphs.

Print: Print screen images and reports.

Save: Save measured data and setting information files.

Exit: Close the software.

Icon Display

Icon Number
This number indicates an icon’s order in a menu.

Standard Menus

The following four standard menus are available.

- New Measurement: Set measurement and judgment conditions, make measurements, and then print and save the data.
- Save Data Analysis: Analyze, print, and save data that was measured and saved in the past.
- Save Data Print: Print data that was measured and saved in the past.
- Repeat Measurement: Make measurements with the same measurement and judgment conditions that you used for the previous measurement, and print and save data without analyzing it.

Setting Up Custom Test Schedule Menus

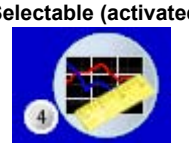
You can create custom test schedule menus by selecting what steps to include in them. You can create up to five different custom test schedule menus.

- Start and Exit steps are always selected. You cannot deselect them.
- The steps are arranged in the order that they appear in the menu customization dialog box. You cannot change this order.

Icon Activation/Deactivation

Some icons cannot be selected out of order. These icons are grayed out.

Selectable (activated)



Not selectable (deactivated)

For example, the Measure icon cannot be selected when the Connection menu has been set such that the software is in offline mode. Icons such as Open, Connection, and Setting cannot be selected during measurement.

The following is a list of each icon and when it cannot be selected.

Start	During measurement
Open	During measurement
Connection	During measurement
Setting	During measurement
Measurement	When the software is in offline mode
Analysis	During measurement, or when there is no measured data to analyze
Print	During measurement, or when there is no measured data to print
Save	During measurement, or when there is no measured data to save
Exit	During measurement

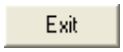
4.2 Closing the Software

Procedure

1. Select the icon in the menu area. The Exit submenu appears.

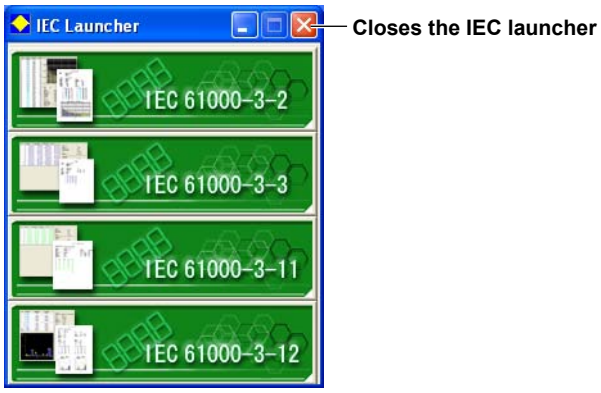
Closing the IEC 61000-3-3 Voltage Fluctuation and Flicker Measurement Software

2. Click **Exit**. The software closes.



Closing the IEC61000 Launcher

Click the icon below.

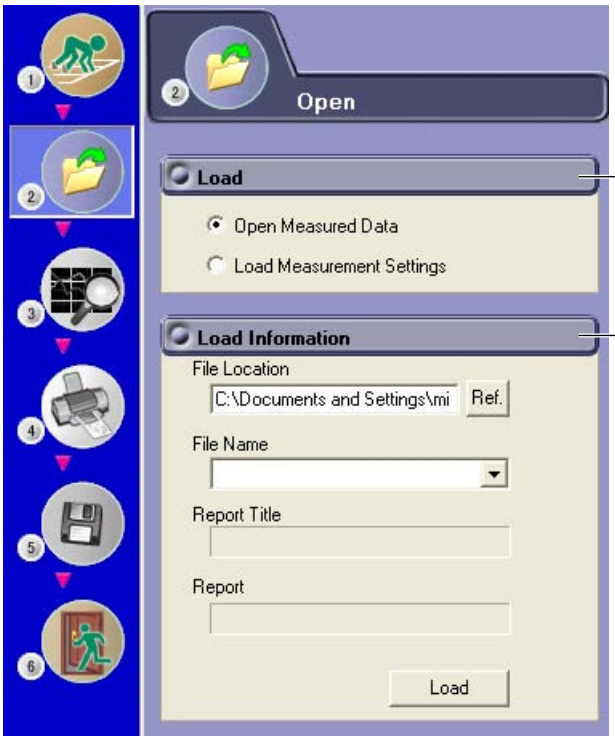


Closes the IEC launcher

5.1 Loading Setting Information and Measured Data

Procedure

1. Select the icon in the menu area. The Open submenu appears.

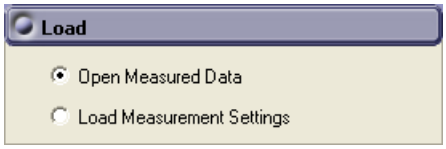


Load (page 5-2)
Select the type of data to load.

Load Information (page 5-2)
Select a file to open. When you select a file, its information appears.

Selecting the Type of Data to Load

2. Select one of the two data types listed under Load.



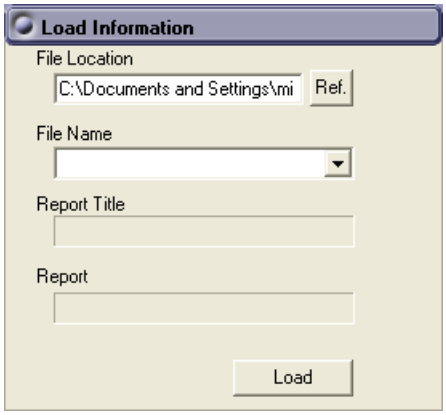
Selecting a File to Open

3. Specify the file location. There are two places where you can specify the file location.
- Under Load Information in the submenu
- At the top of the setting and display area

When you specify the file location, information about the files that can be loaded appears in the setting and display area.

4. Select a file to open. When there is more than one available file, you can select which file to open using one of the following two methods.
- Click on the ▼ next to the File Name box under Load Information. A list of available files appears. Select a file from the list.
- Select a file to open from one of the files listed in the setting and display area.

5. Click **Load**, or double-click the file you want to open. The software will open the measured data or setting information file.



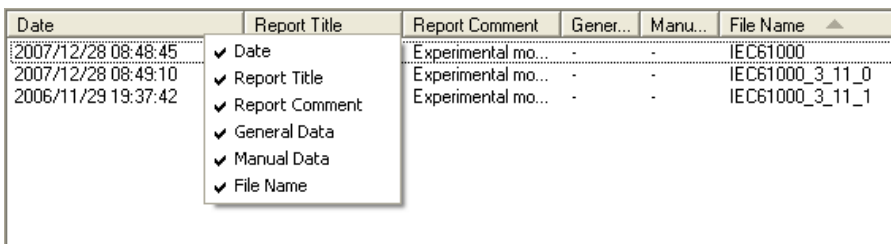
Note

- When the software is in online mode, it will switch to offline mode if you load setting information or measured data.
- If an error occurs while loading the setting information, the settings are reset to their default values.
- If an error occurs while loading measured data or setting information, the data may not be loaded properly. Confirm the filename and extension and then reopen the file.
- You cannot load setting information or measured data while making measurements.

Configuring File Information Display Settings

1. Right-click on the file information heading area at the top of the setting and display area. A list of the different types of information that can be displayed appears.

2. Select the type of information that you want to be displayed.



Explanation

Loading Setting Information

You can load the setting information that has been saved using the procedure described in section 11.1.

- A dash appears in the General Data and Manual Data columns for setting information files.
- Setting information file names have the following extension.
  Extension: .ini
- Setting information files contain the following:
  - Measurement and judgment conditions (see chapter 7)
    Data that has been acquired from the WT or loaded from a file can be judged using loaded judgment conditions.
  - Graph display settings (see sections 9.2 and 9.3)
  - Report titles and comments (see section 10.1)
    You can put comments and titles on reports of data acquired from the WT or loaded from files, and then print and save the reports. For more information about printing and saving, see chapters 10 and 11.

Loading Measured Data and Setting Information

- You can load the measured data and setting information that has been saved using the procedure described in section 11.1.
- An asterisk appears in the General Data and Manual Data columns for files that contain measured data.
- Files that contain measured data are composed of two types of files with the following extensions.
  Extension: .fdt Measured data
  .ini Setting information

Note

You cannot load setting information unless the flicker measurement status is Reset. For more information about the flicker measurement status, see sections 8.1 and 8.2.

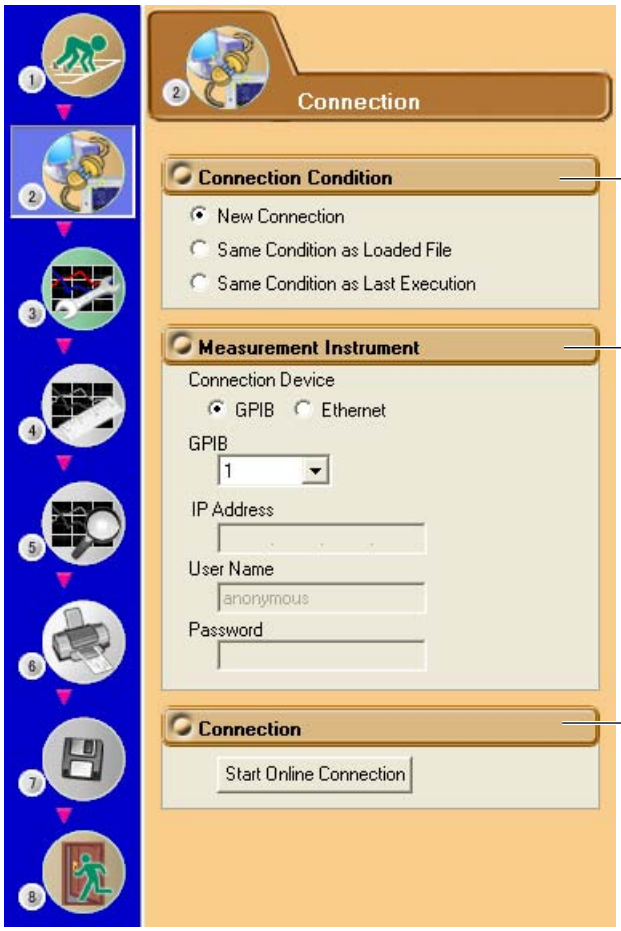
Kinds of File Information

- Date: When the file was saved. Displayed in this format: year/month/day hour:minute:second
- Report Title (See section 10.1)
- Report Comment (See section 10.1)
- General Data: If data acquired in General mode (normal voltage fluctuation and flicker measurement) is contained in the file, an asterisk appears here.
- Manual Data: If data acquired in Manual mode (measurement of dmax caused by manual switching) is contained in the file, an asterisk appears here.
- Click ▼ or ▲ to switch between sorting in ascending and descending order.

6.1 Establishing a New Connection Between the PC and a WT

Procedure

1. Select the icon in the menu area. The Connection submenu appears.



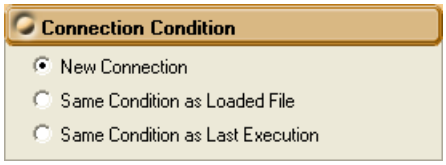
Connection Condition (page 6-2)
Select the connection condition (the connection settings).

Connection Device (page 6-2)
Select the communication interface and configure the connection settings.

Connection (page 6-3)
Switch between online and offline mode.

Connection Condition

2. Select **New Connection**.



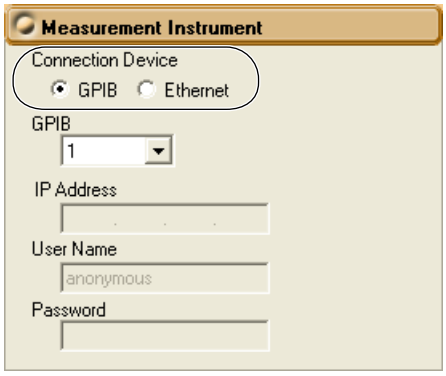
Note

- You can only select Same Condition as Loaded File if you load setting information or measured data using the procedure described in section 5.1.
- You cannot select Same Condition as Last Execution when you first start up the software.

Connection Device

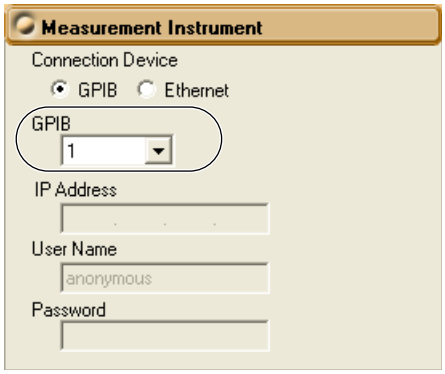
3. Select **GPIB** or **Ethernet**.

- If you select GP-IB, proceed to step 4.
- If you select Ethernet, proceed to step 5.



Selecting a Communication Address (GP-IB)

4. Select the GP-IB address of the WT that you intend to connect to.



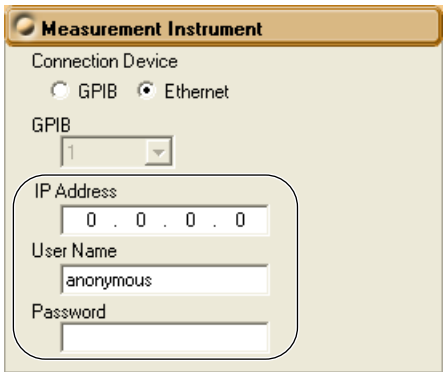
Proceed to step 6.

Note

GP-IB address number 0 is reserved for the PC and cannot be selected.

Setting the IP Address, User Name, and Password (Ethernet)

5. Set the IP address, user name, and password of the WT that you intend to connect to.



Making the Connection

6. Click **Start Online Connection**. The software will establish a connection between the PC and the WT. The configuration and measurement operations listed onwards can be performed once the software has automatically determined that communication is possible.

Note

- You cannot proceed to measurement, analysis, printing, or saving until an online connection has been established.
- If you click Start Online Connection and establish a connection, but the connected WT is not in a measurement-ready state, a communication error will occur. If the GP-IB address, IP address, user name, or password is wrong, or if the PC is simply unable to connect to the WT, a communication error will occur.

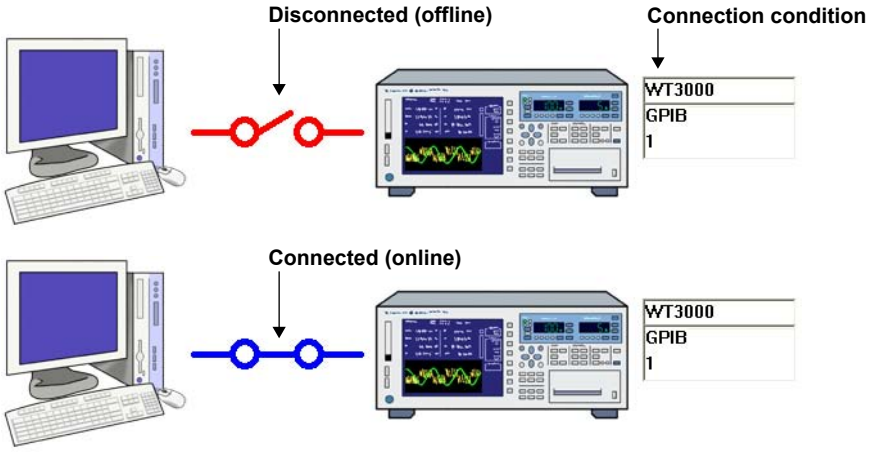
Explanation

Selecting a Communication Address

- **GP-IB**
  Select the GP-IB address of the WT that you intend to connect to.
  Selectable range: 1 to 30
- **Ethernet**
  - Set the IP address of the WT that you intend to connect to.
    Selectable range: 0.0.0.0 to 255.255.255.255
  - You can set the user name and password of the WT that you intend to connect to.
    Usable characters: Those characters that the WT supports.

Displaying Connection Conditions and Status

The connection conditions that you set in the Connection submenu appear in the setting and display area along with the current connection status.



The connection status also appears in the information area.

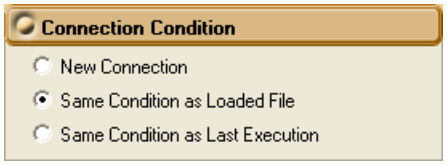
Note

- It can take more than 10 seconds to switch from offline to online mode.
- We recommend that you use a National Instruments GP-IB card. GP-IB cards made by other companies may not function properly.

6.2 Using the Connection Settings from a Loaded File

Procedure

1. Select the icon in the menu area. The Connection submenu appears. For general information about the Connection submenu, see section 6.1.
2. Select **Same Condition as Loaded File** under Connection Condition.



Note

You can only select Same Condition as Loaded File if you load setting information using the process described in section 5.1.

Making the Connection

3. Click **Start Online Connection**. The software will establish a connection between the PC and the WT. The configuration and measurement operations listed onwards can be performed once the software has automatically determined that communication is possible.

Note

- You cannot proceed to measurement, analysis, printing, or saving until an online connection has been established.
- If you click Start Online Connection and establish a connection, but the connected WT is not in a measurement-ready state, a communication error will occur. If the GP-IB address, IP address, user name, or password is wrong, or if the PC is simply unable to connect to the WT, a communication error will occur.

Explanation

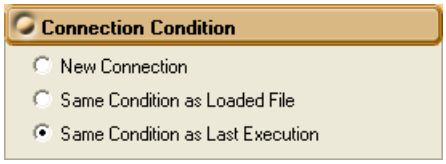
Follow this procedure to use the settings from a file that has been loaded according to the procedure described in “Loading Setting Information” in section 5.1.

6.3 Using the Same Connection Settings as Before

Procedure

1. Select the icon in the menu area. The Connection submenu appears. For general information about the Connection submenu, see section 6.1.

2. Select **Same Condition as Last Execution** under Connection Condition.



Note

You cannot select Same Condition as Last Execution when you first start up the software.

Making the Connection

3. Click **Start Online Connection**. The software will establish a connection between the PC and the WT. The configuration and measurement operations listed onwards can be performed once the software has automatically determined that communication is possible.

Note

- You cannot proceed to measurement, analysis, printing, or saving until an online connection has been established.
- If you click Start Online Connection and establish a connection, but the connected WT is not in a measurement-ready state, a communication error will occur. If the GP-IB address, IP address, user name, or password is wrong, or if the PC is simply unable to connect to the WT, a communication error will occur.

Explanation

Follow this procedure to set the connection settings to the same as when you last closed this software.

6.4 Ending a Connection by Switching to Offline Mode

Procedure

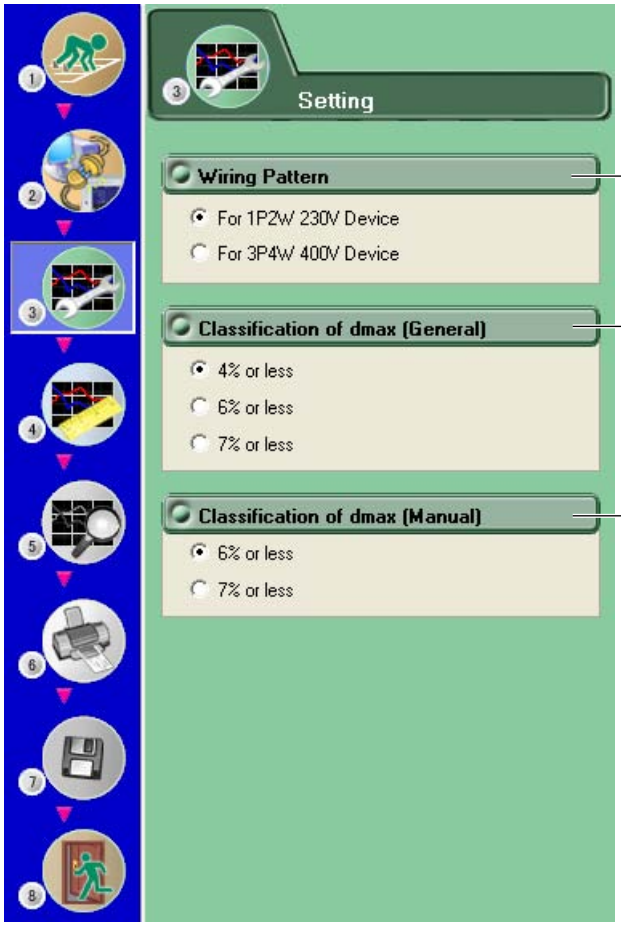
1. Select the icon in the menu area. The Connection submenu appears. For general information about the Connection submenu, see section 6.1.

2. When you are in online mode, click **Exit online connection**. The software will disconnect from the WT.

7.1 Setting General Test Conditions

Procedure

1. Select the icon in the menu area. The Setting submenu appears.



Wiring Pattern (page 7-2)
Select the wiring pattern of the circuit you will measure.

Classification of dmax (General) (page 7-2)
When making normal voltage fluctuation and flicker measurements (General mode), select the dmax classification here.

Classification of dmax (Manual) (page 7-2)
When measuring the dmax caused by manual switching (Manual dmax mode), select the dmax classification here.

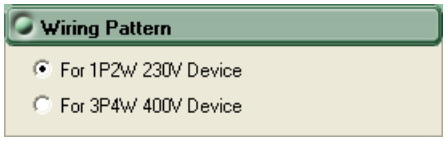
In the setting and display area, you can switch between basic settings and advanced settings by clicking these buttons: . For details, see sections 7.2 and 7.3.

Basic settings

Advanced settings

Wiring Pattern

2. Select the wiring pattern of the circuit you will measure.



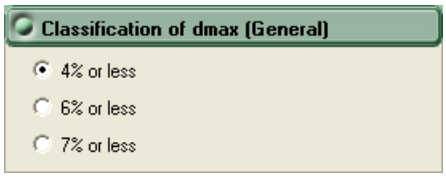
Note

When you switch wiring patterns, the following settings, which are displayed in the setting and display area, will change to default values that are appropriate to the wiring pattern that you select. For details, see sections 7.2 and 7.3.

- The WT settings (the settings on the WT Measurement Instrument tab)
- The testing judgment conditions (the settings under the Standard tab).

Classification of dmax (General)

3. When making normal voltage fluctuation and flicker measurements (General mode), select the dmax classification here.

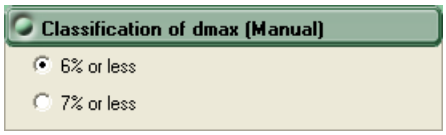


Note

When you change this setting, the dmax setting that is displayed under Judge (General) on the WT Measurement Instrument tab in the setting and display area will also change. For details, see section 7.3.

Classification of dmax (Manual)

4. When measuring dmax caused by manual switching (Manual dmax mode), select the dmax classification here.



Note

When you change this setting, the dmax setting that is displayed under Judge (Manual) on the WT Measurement Instrument tab in the setting and display area will also change. For details, see section 7.3.

Explanation

Classification of dmax

The limit dmax is 4, 6, or 7% depending on the conditions. For information about the conditions that affect dmax, see section 1.3.

7.2 Setting the WT Measurement Conditions

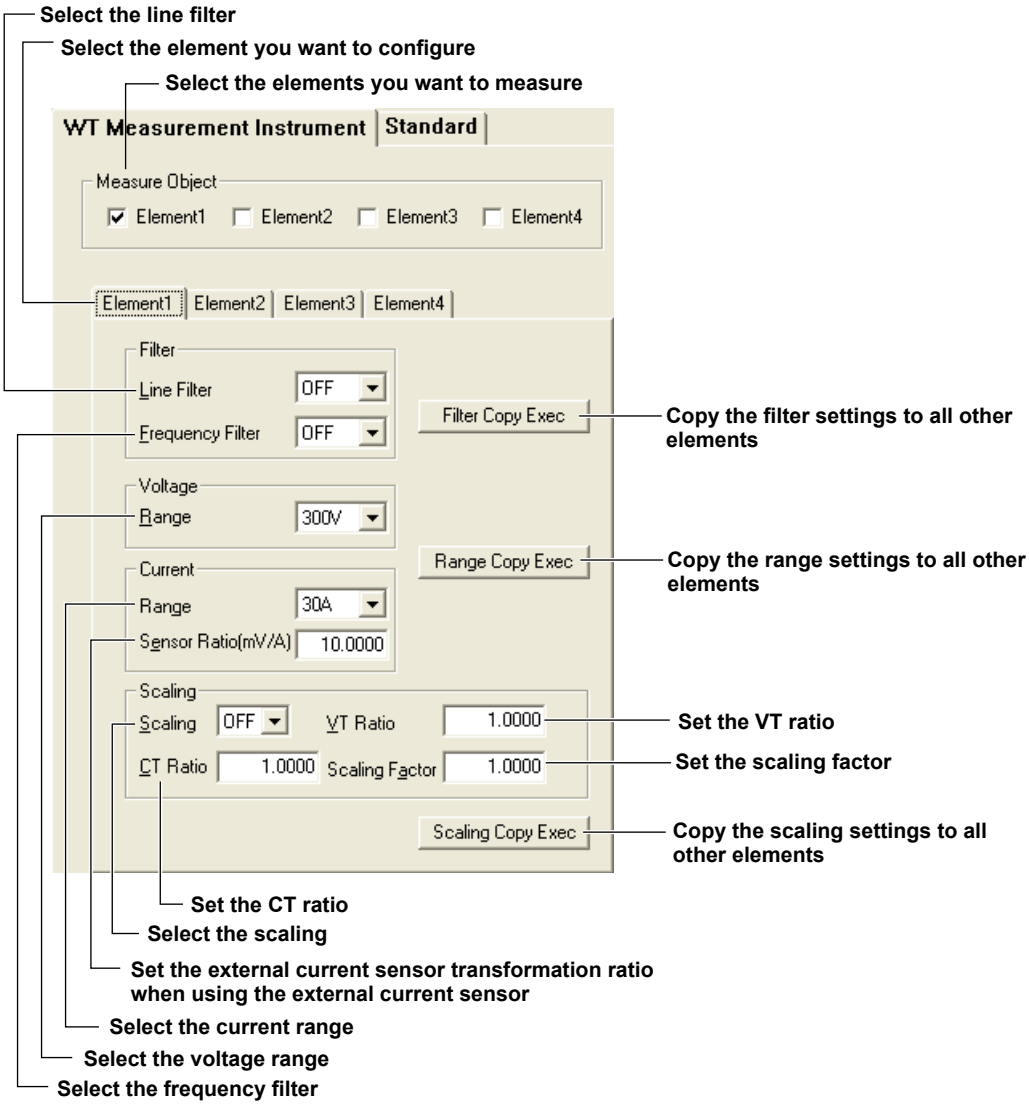
Procedure

1. Select the **WT Measurement Instrument** tab in the setting and display area. The WT measurement condition configuration dialog box appears.
2. Click the basic settings button ( ) or the advanced settings button ( ).
3. Configure the various settings.

Note

When you select the basic settings button, the following settings are unavailable. To adjust these settings, click the advanced settings button.

- Filter Copy Exec
- Scaling ON/OFF



Explanation

Measure Object
Select the object whose voltage fluctuation and flicker will be measured. The equipped elements are displayed as settable objects.

Copying the Line Filter
You can copy the line filter settings configured for one element to all other elements with the same wiring.

Copying the Frequency Filter
You can copy the frequency filter settings configured for one element to all other elements with the same wiring.

Copying the Range
You can copy the range settings configured for one element to all other elements with the same wiring. The voltage range and the current range are copied.

Copying the Scaling Settings
You can copy the scaling settings configured for one element to all other elements with the same wiring. The settings that are copied are:
- External current sensor conversion ratio
- VT ratio
- CT ratio
- Scaling factor

For information about the following settings and how to make settings from the WT, see the *WT3000 User's Manual (IM760301-01E)*.

Setting	Corresponding section in the user's manual	
Line filter	IM760301-01E	Section 4.8
Frequency filter	IM760301-01E	Section 4.8
Voltage/current range	IM760301-01E	Sections 4.3 and 4.4
Scaling	IM760301-01E	Section 4.5

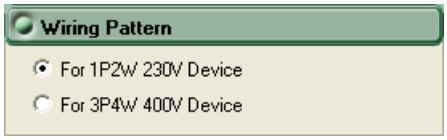
Note

You can only change measurement conditions in online mode with the flicker measurement status set to Reset. For more information about the flicker measurement status, see sections 8.1 and 8.2.

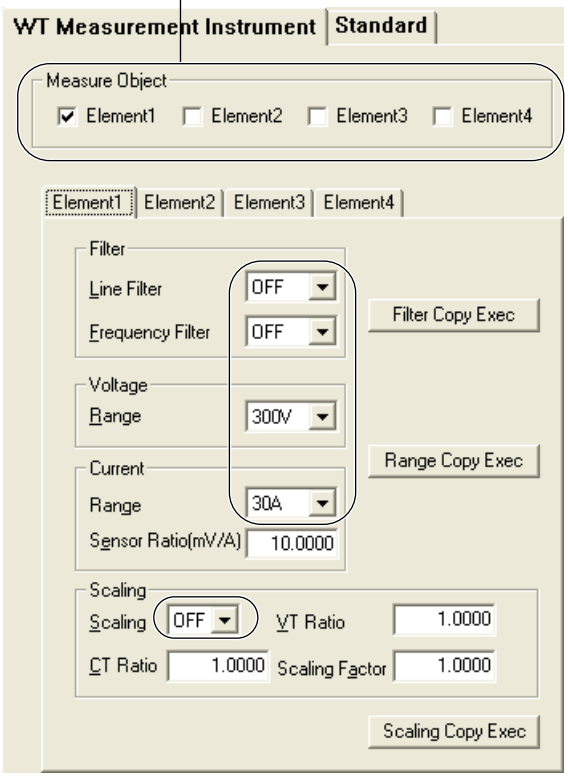
Setting Changes Based on Wiring Pattern Selection

When you select a wiring pattern in the Setting submenu, the settings marked off in the following figures change to their default values. The values in the figures are the default values.

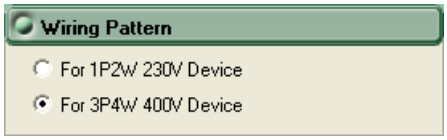
- **Changes when you select "For 1P2W 230V Instrument."**

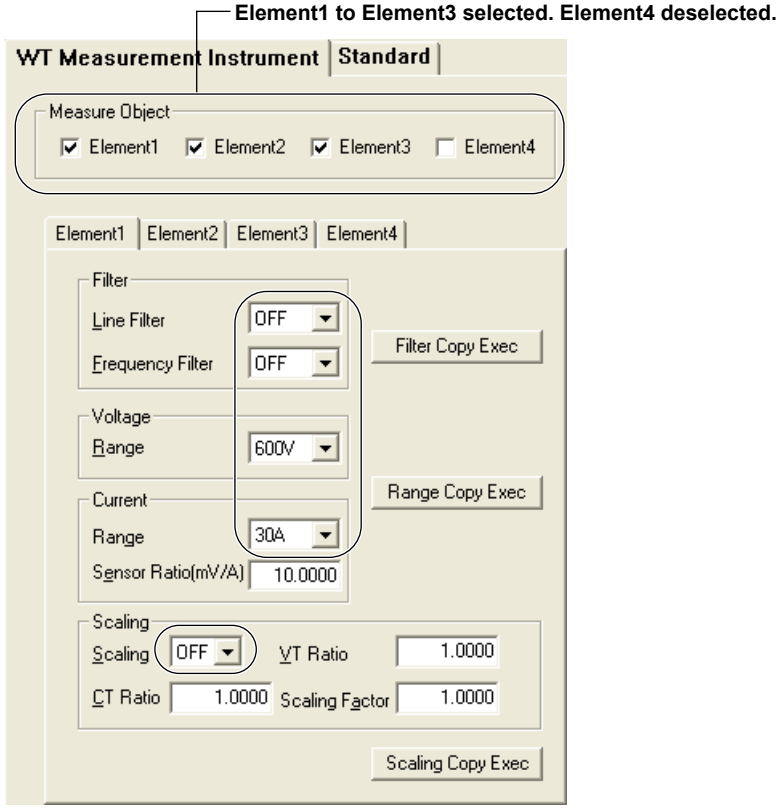


Element1 selected. Element2 to Element4 deselected.



- **Changes when you select "For 3P4W 400V Instrument."**





7.3 Setting the WT Judgment Conditions

Procedure

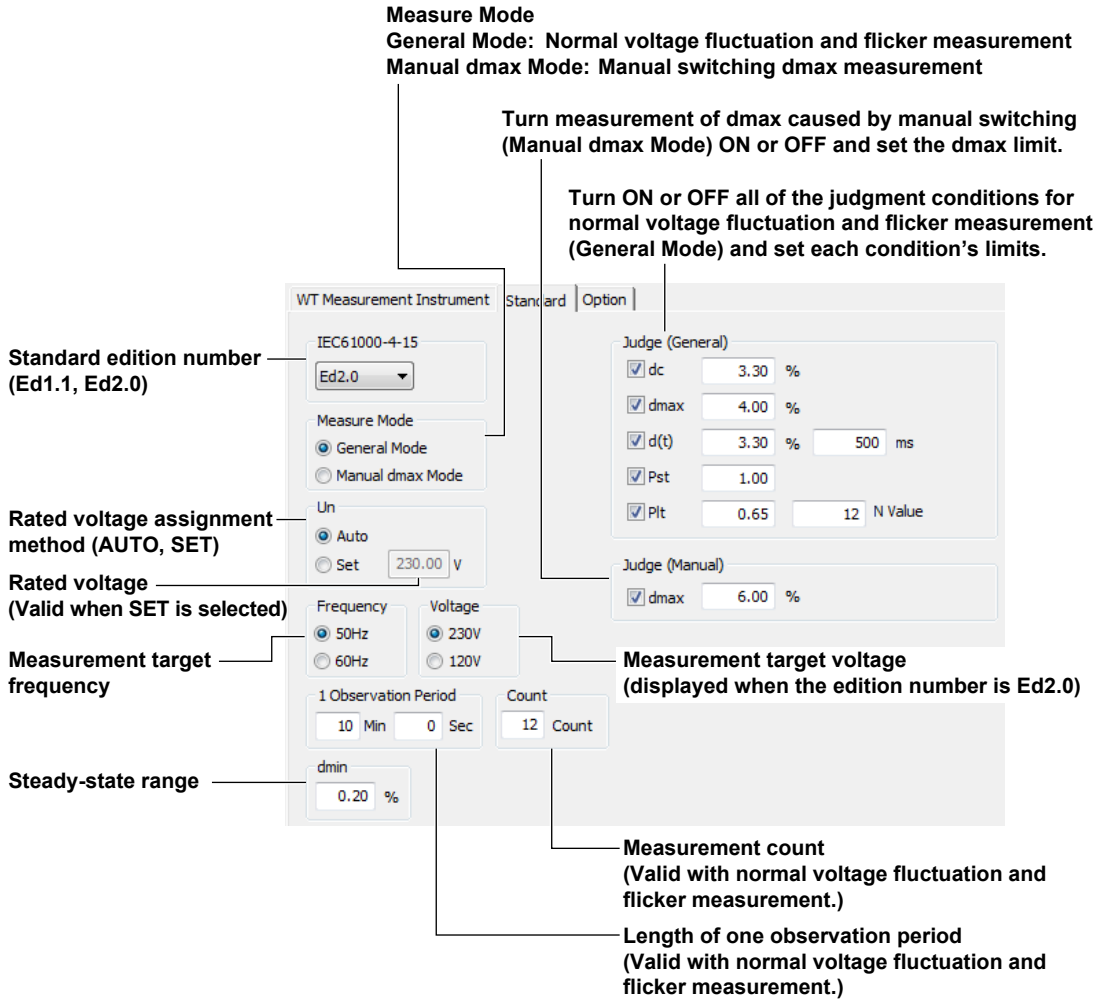
1. Select the **Standard** tab in the setting and display area. The judgment condition configuration dialog box appears.
2. Click the basic settings button ( ) or the advanced settings button ( ).
3. Configure the various settings.

Note

When you select the basic settings button, the following settings are unavailable. To adjust these settings, click the advanced settings button.

- Measure Mode
- Un
- Frequency
- 1 Observation Period
- Count
- dmin
- dc, d(t), Pst, Plt of the Judge (General)

When measured data has been loaded, the normal voltage fluctuation and flicker measurement judgment condition d(t), located under Judge (General), is unavailable.



Explanation

For an explanation of the terminology, see section 1.5.

Edition of the Standard

In WT firmware versions 5.21 and later, you can select the IEC 61000-4-15.

Edition No. of the IEC 61000-4-15

- Edition 1.1
- Edition 2.0

IEC 61000-4-15 specifies requirements for measurement instruments. For details, see chapter 14. In WT3000 firmware versions 4.01 to 5.20, the edition is fixed at IEC 61000-4-15 edition 1.1.

Measure Mode

Select the voltage fluctuation and flicker measurement method from the two methods below.

- General Mode (normal voltage fluctuation and flicker measurement)
  Judges whether values such as dc, dmax, d(t), and Pst are within the specified limits.
- Manual dmax Mode (measurement of dmax caused by manual switching)
  You manually turn the EUT switch ON. The WT3000 measures the voltage fluctuation caused by the inrush current that flows when the power is turned ON, and judges whether the dmax average is within the specified limits.

Rated Voltage (Un)

You can select the assignment method of the rated voltage.

- AUTO
  Automatically retrieves the measured voltage at the start of the voltage fluctuation and flicker measurement as the rated voltage.
- SET
  You can set the rated voltage in the range of 0.01 to 999.99 V.

Measurement Target Frequency

You can set the measurement target frequency to 50 Hz or 60 Hz.
Set the measurement source frequency appropriately as the transfer function of the flicker meter and other parameters change accordingly.

If the measurement mode is set to General Mode (normal voltage fluctuation and flicker measurement), you must set the single observation period, measurement count, and steady-state range.

Measurement Target Voltage (Displayed when Ed2.0 is selected)

You can set the measurement target voltage to 230 V or 120 V.
Set the measurement source voltage appropriately as the transfer function of the flicker meter and other parameters change accordingly.

1 Observation Period

You can set the single observation period of short-term flicker value Pst in unit of minutes and seconds in the following range.
00:30 to 15:00 (only even values can be specified for the seconds)

Measurement Count

You can set the measurement count of short-term flicker value Pst in the range of 1 to 99.

Steady-State Range (dmin: Allowable Range of Relative Voltage Change to Be Considered Steady-State)

You can set steady-state range dmin in the range of 0.10 to 9.99%.

Normal Voltage Fluctuation and Flicker Measurement (General Mode)

Judgment Conditions for Relative Steady-State Voltage Change dc

- **Turning ON/OFF the Judgment of Relative Steady-State Voltage Change dc**
  You can select whether to include relative steady-state voltage change dc in the flicker measurement judgment.

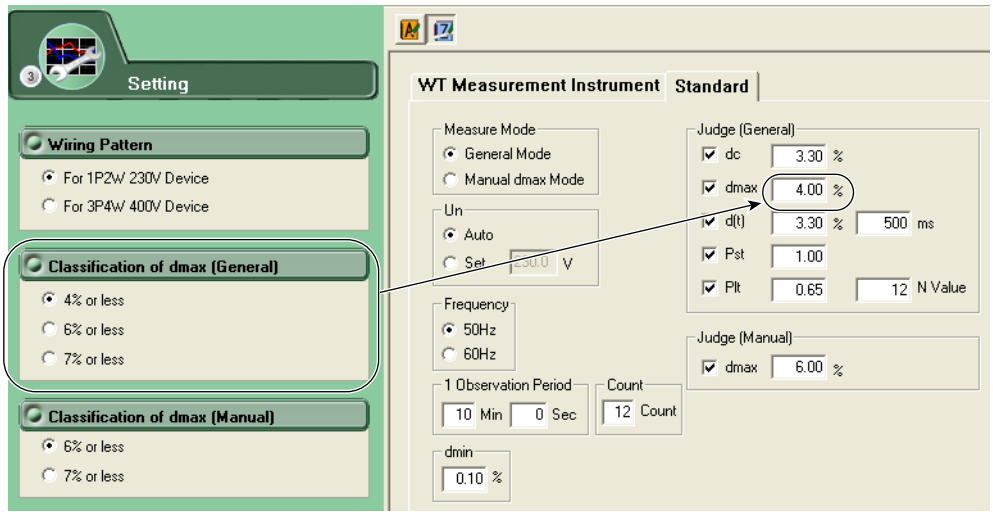
- **Limit on Relative Steady-State Voltage Change dc**
  You can set the limit in the range of 1.00 to 99.99%.

Judgment Conditions for Maximum Relative Voltage Change dmax

- **Turning ON/OFF the Judgment of Maximum Relative Voltage Change dmax**
  You can select whether to include maximum relative voltage change dmax in the flicker measurement judgment.

- **Limit on Maximum Relative Voltage Change dmax**
  You can set the limit in the range of 1.00 to 99.99%.

  However, after you set a value, if you perform step 5 on page 7-2, the limit will be changed to the value you set there.



Judgment Conditions for Period during Which Relative Voltage Change Exceeds the Threshold Level d(t)

- **Turning ON/OFF the Judgment of Period during Which Relative Voltage Change Exceeds the Threshold Level d(t)**
  You can select whether to include the period during which the relative voltage change exceeds the threshold level d(t) in the flicker measurement judgment.
- **Threshold Level**
  You can set the threshold level in the range of 1.00 to 99.99%.
- **Limit on the Period during Which Relative Voltage Change Exceeds the Threshold Level d(t)**
  You can set the limit in the range of 1 to 99999 ms.

Judgment Conditions for Short-Term Flicker Value Pst

- **Turning ON/OFF the Judgment of Short-Term Flicker Value Pst**
  You can select whether to include short-term flicker value Pst in the flicker measurement judgment.
- **Limit on Short-Term Flicker Value Pst**
  You can set the limit in the range of 0.10 to 99.99.

Judgment Conditions for Long-Term Flicker Value Plt

- **Turning ON/OFF the Judgment of Long-Term Flicker Value Plt**
  You can select whether to include long-term flicker value Plt in the flicker measurement judgment.
- **Limit on Long-Term Flicker Value Plt**
  You can set the limit in the range of 0.10 to 99.99.
- **Constant N of the Calculating Equation of Long-Term Flicker Value Plt**
  You can set constant N in the range of 1 to 99.

Note

- The long-term flicker value (Plt) is computed using the following equation.

$$Plt = \sqrt[3]{\frac{\sum_{i=1}^{Count} Psti^{3}}{N}}$$

  The variable Count in the equation is the measurement count of short-term flicker value (Pst). The variable N in the equation is the constant of the calculating equation of long-term flicker value (Plt).
  In general, set Count and N to the same value.
  If N is set greater than Count, the short-term flicker value is measured the number of times specified by Count. The short-term flicker values (Pst) that are not measured are substituted with zeroes in the above equation to calculate the long-term flicker value (Plt). N is set greater than Count such as when the measured source automatically stops within the specified observation time.
- You can change the judgment conditions only in On-Line Mode when the flicker measurement status is Reset or Complete. For details on the flicker measurement status, see section 8.1 or 8.2.
- You can set judgment conditions on items other than dmax during the measurement of dmax caused by manual switching, but judgment is not performed on them.

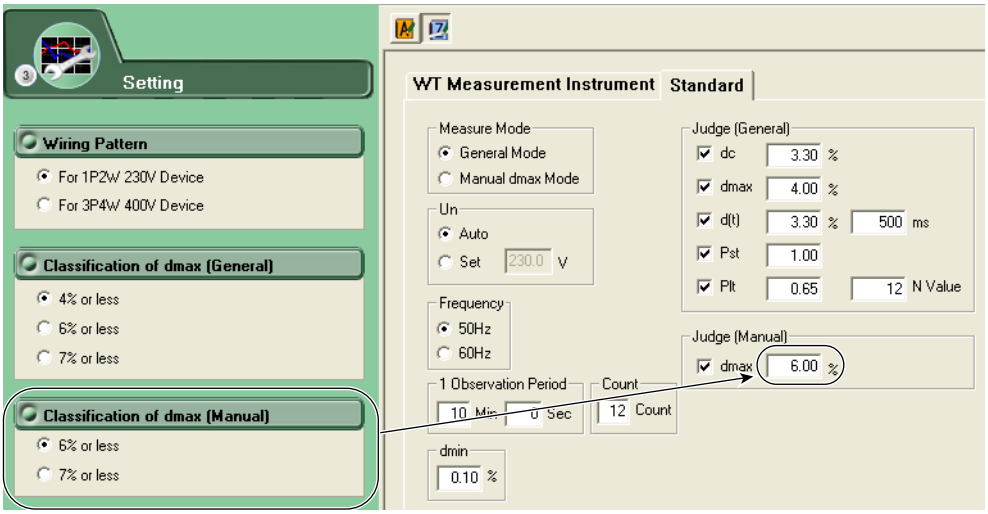
Judgment Conditions for Measurement of dmax Caused by Manual Switching (Manual dmax mode)

Judgment Conditions for Maximum Relative Voltage Change dmax

- **Turning ON/OFF the Judgment of Maximum Relative Voltage Change dmax**
  You can select whether to include maximum relative voltage change dmax in the flicker measurement judgment.

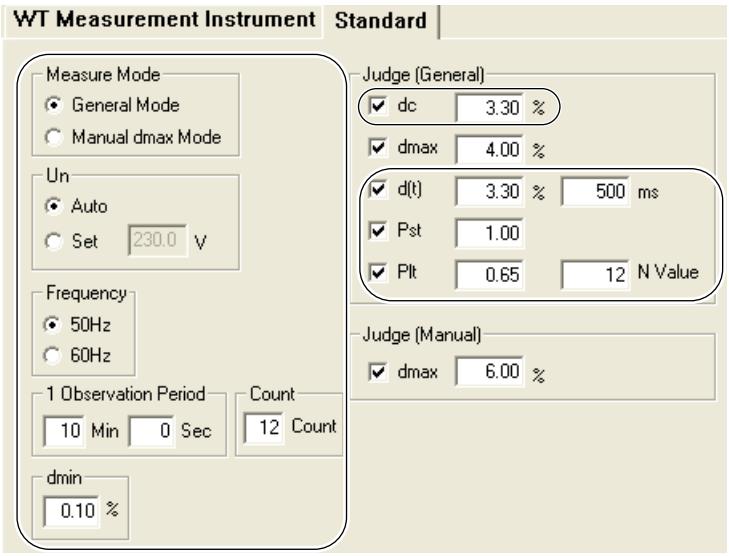
- **Limit on Maximum Relative Voltage Change dmax**
  You can set the limit in the range of 1.00 to 99.99%.

  However, after you set a value, if you perform step 5 on page 7-2, the limit will be changed to the value you set there.



How Settings Change Based on the Selected Wiring Pattern

When you select a wiring pattern in the Setting submenu, the settings marked off in the figure below change to their default values. The values in the figure below are the default values.

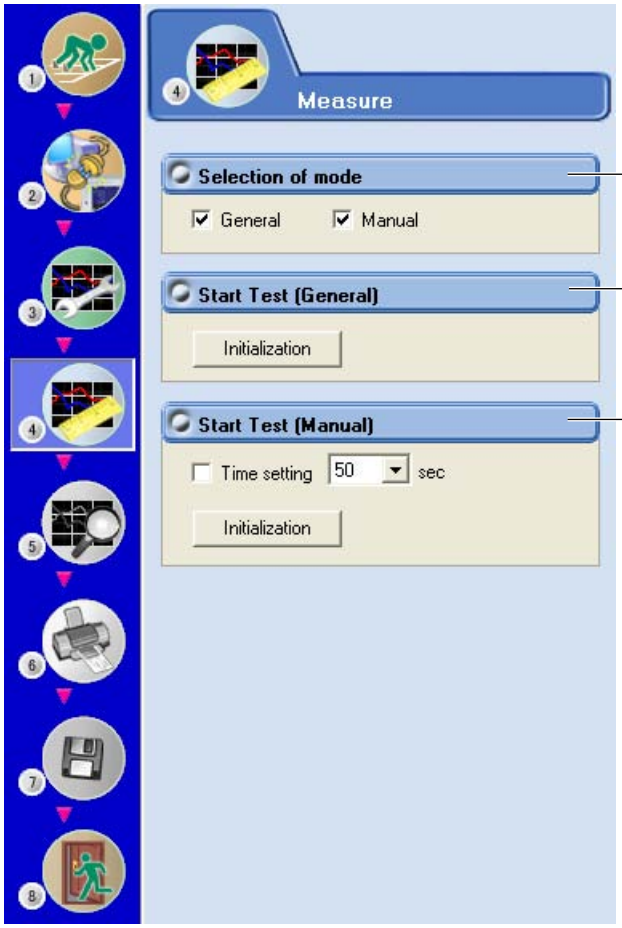


8.1 Executing the Normal Voltage Fluctuation and Flicker Measurement

A normal voltage fluctuation and flicker measurement complying with IEC 61000-3-3 is executed.
Calculates all the voltage fluctuation and flicker values of dc, dmax, d(t), Pst, and Plt, compares them to the preset limits, and indicates the overall judgment.

Procedure

1. Select the icon in the menu area. The Setting submenu appears.

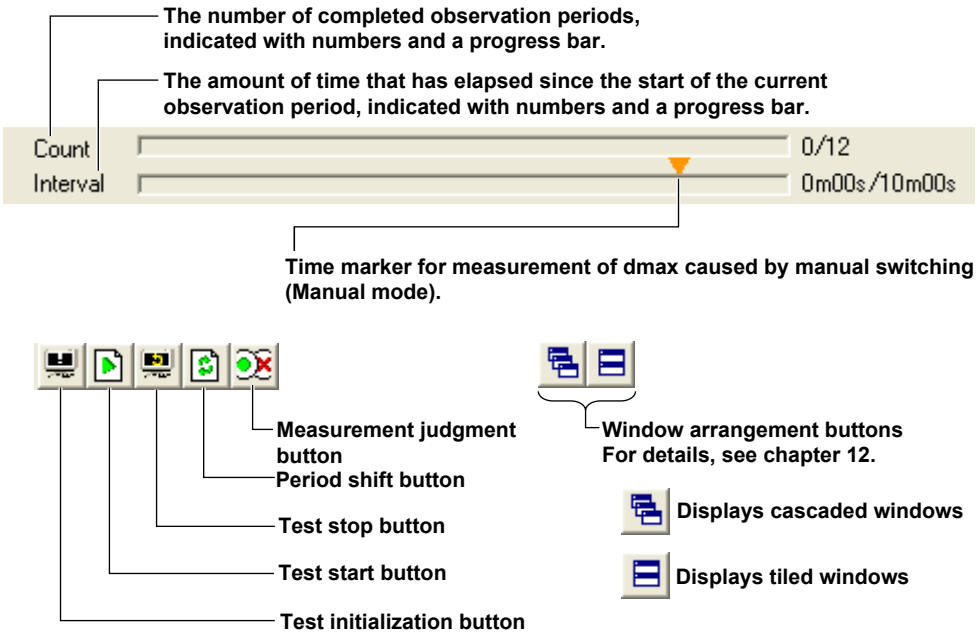


Selection of mode (page 8-3)
Select which kind of measurement to perform.

Start Test (General) (page 8-3)
Perform normal voltage fluctuation and flicker measurement (General mode).

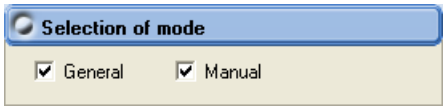
Start Test (Manual) (section 8.2)
Perform measurement of dmax caused by manual switching (Manual mode).

Upper portion of the setting and display area (icons that cannot be selected are grayed out):



Selecting a Test Mode

2. Select **General**.

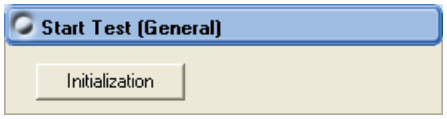


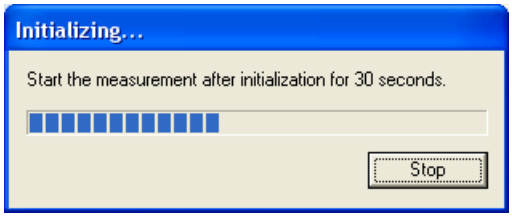
Starting a Compliancy Test

Check that the software is in On-Line mode and that the flicker measurement status is indicating Reset (condition in which the measured value is reset and initialization can be executed). If not, set the flicker measurement status to Reset according to the procedure in “Resetting the Measurement” on page 8-7.

Initializing a Test

3. Click **Initialization** under Start Test (General) or click the button. The initialization dialog box appears, and initialization begins.



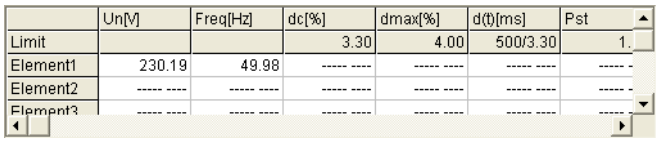


Once initialization is complete, the initialization dialog box will automatically close, initialization button turns start test button. And the Numeric View window will display:

- The current measured values for Un[V] and Freq[Hz].
- “----” for dc[%], dmax [%], d(t)[ms], and Pst.

Note

“----” will appear in every column for elements that you do not select under Measure Object in the Setting window.



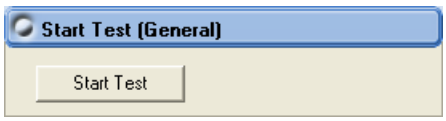
	Un[V]	Freq[Hz]	dc[%]	dmax[%]	d(t)[ms]	Pst
Limit			3.30	4.00	500/3.30	1.
Element1	230.19	49.98	----- ----	----- ----	----- ----	-----
Element2	----- ----	----- ----	----- ----	----- ----	----- ----	-----
Element3	----- ----	----- ----	----- ----	----- ----	----- ----	-----

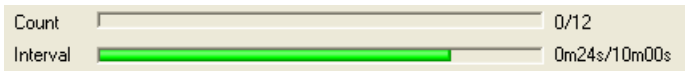
Starting a Test

4. Click **Start Test** under Start Test (General) or click the button. The Numeric View window will display:

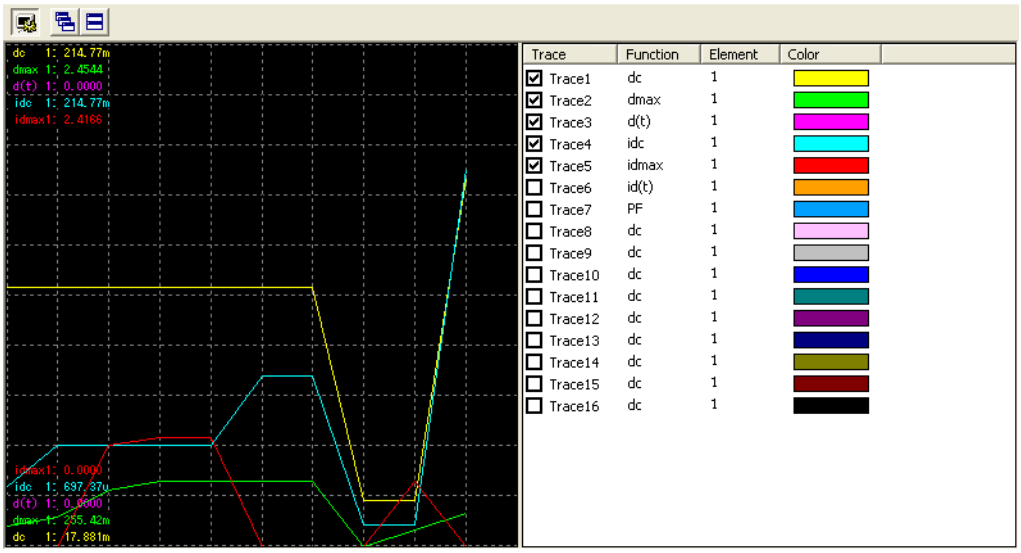
- Fixed values for Un[V] and Freq[Hz]
- The maximum measured values within the observation period for dc[%], dmax [%], d(t)[ms], and Pst.

The bar and numbers next to Interval indicate how much time has passed. The bar and numbers next to Count indicate how many observation periods have finished. The measurement results appear in the Trend Graph View window.





	Un[V]	Freq[Hz]	dc[%]	dmax[%]	d(t)[ms]	Pst
Limit			3.30	4.00	500/3.30	1.
Element1	229.95	50.00	0.10 ----	0.57 ----	0.00 ----	-----
Element2	----- ----	----- ----	----- ----	----- ----	----- ----	-----
Element3	----- ----	----- ----	----- ----	----- ----	----- ----	-----

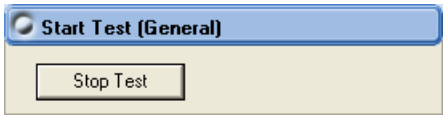


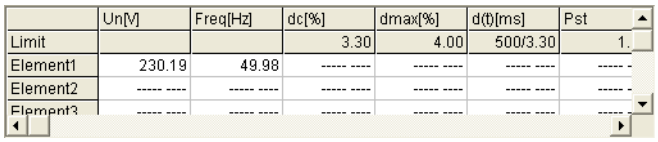
When the measurement of all observation periods is complete, the normal voltage fluctuation and flicker measurement automatically stops. The result and judgment are displayed.

	Un[V]	Freq[Hz]	dc[%]	dmax[%]	d(t)[ms]	Pst
Limit			3.30	4.00	500/3.30	1.
Element1	229.95	50.00	0.52 Pass	1.75 Pass	0.00 Pass	0.12 Pa
Element2	----- ----	----- ----	----- ----	----- ----	----- ----	-----
Element3	----- ----	----- ----	----- ----	----- ----	----- ----	-----

Stopping a Test

1. Click **Stop Test** under Start Test (General) or click the button.
   The dialog box closes, and measurement stops. The measured data and test results are discarded, and Interval and Count in the Numeric View window are cleared.





Note

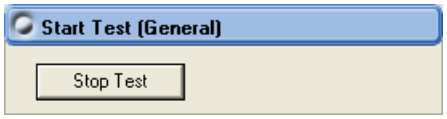
If you click **Cancel**, the dialog box closes, and the measurement continues.

Changing the Judgment Conditions and Re-judging the Measured Data

When the normal voltage fluctuation and flicker measurement is complete, change the judgment conditions according to the procedure given in “Setting the Judgment Conditions” in chapter 6. If you change the judgment conditions, the measured voltage fluctuation and flicker data is re-judged, and the judgment is updated.

Resetting a Test

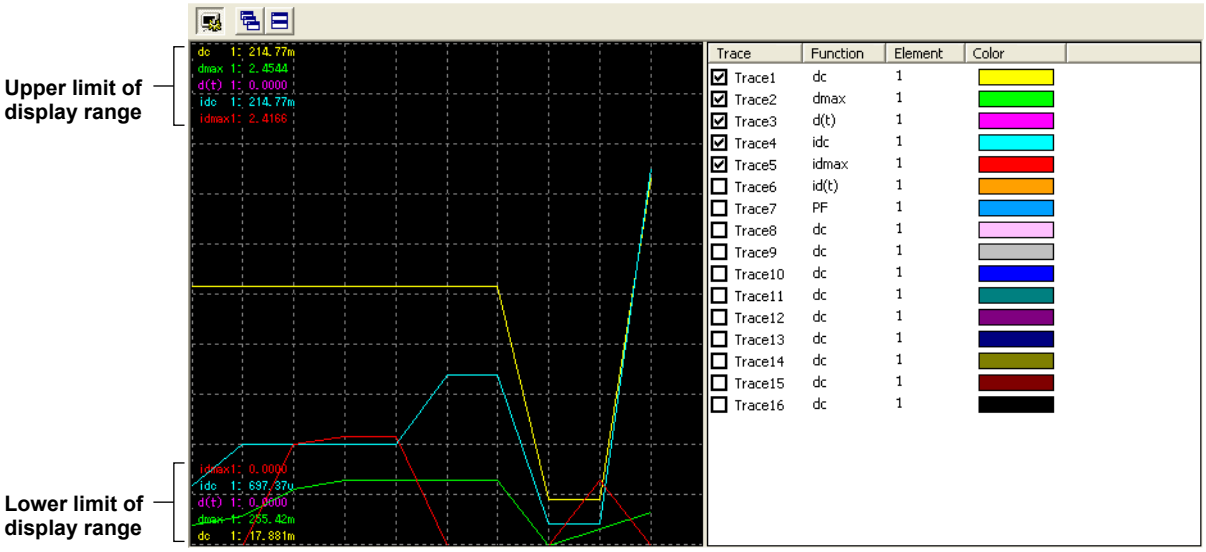
1. Click **Stop Test** under Start Test (General) or click the button.
   The dialog box closes, and measurement is reset. The measured data and test results are discarded, and Interval and Count in the Numeric View window are cleared.



Note

If you do not want to reset the test, click **Cancel**.

Setting the Trend Graph Traces



Trace

Select the trends you want to display (select or clear the check boxes).
Up to 16 trends can be displayed.

Function

Select the measurement function to be displayed.

1. Click on the **Function** column. A combo box opens.
2. Select the measurement function.

Note

You can select from the following measurement functions.

- dc Relative steady-state voltage change
- dmax Maximum relative voltage change
- d(t) Period during which relative voltage change exceeds the threshold level
- idc Instantaneous relative steady-state voltage change
- idmax Instantaneous maximum relative voltage change
- id(t) Period during which instantaneous relative voltage change exceeds the threshold level
- PF Instantaneous flicker sensation (IFS)

Element

Select the element to be displayed.

1. Click on the **Element** column. A combo box opens.
2. Select the element.

Color

Select the display color of the trend.

1. Click on the **Color** column. A combo box opens.
2. Select the display color of the trend.

Explanation

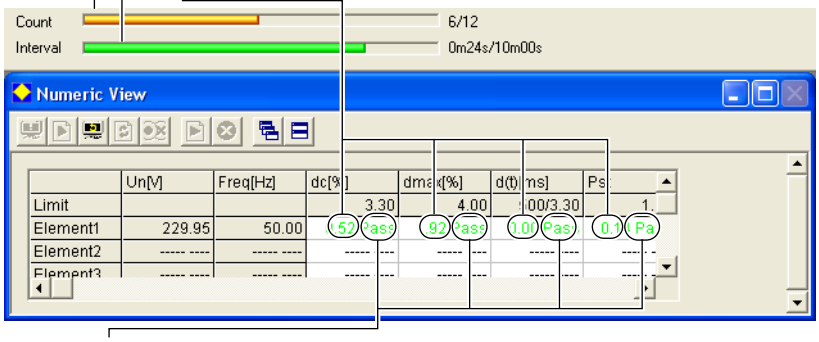
Display during Measurement

The figure below is a display example of normal voltage fluctuation and flicker measurement in progress.

The number of completed observation periods, indicated with numbers and a progress bar.

The amount of time that has elapsed since the start of the current observation period, indicated with numbers and a progress bar.

The measured value for the current observation period.
The dc, dmax, and d(t) values being observed are displayed. The displayed value is the largest valueup to that point. If the instantaneous value every 2 s exceeds the maximum value, the value is updated.

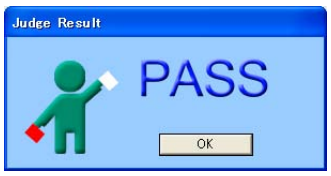


Judgments displayed for completed observation periods

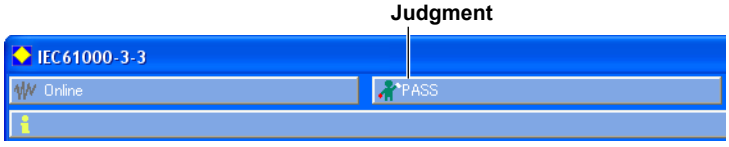
- The final values of dc, dmax, and d(t) are compared with the respective limits, and the judgment (pass or fail) is displayed.
- If a steady-state condition does not occur during the measurement period, it is considered to be a fluctuating condition. The measured value of dc is displayed as Undef (undefined, Ed1.1) or 0 (Ed2.0), and the judgment is displayed as Error (Ed1.1) or Pass (Ed2.0).
- The short-term flicker value, Pst, is calculated, compared to the limit, and the judgment (pass or fail) is displayed.
- The judgment of items whose judgment is turned OFF is displayed as Undef.

Judgment Display after Measurement

Once the test is finished, the overall judgment appears.



The overall judgment appears in the information area.



If all of the elements that are tested pass, PASS appears. Otherwise, FAIL appears.

PASS	PASS
PASS(Under dmin)	Measurement ended without the relative voltage change ever having exceeded steady-state range dmin. (The measured values for dc, dmax, and d(t) were all 0.)
PASS(no steady)	A steady-state condition did not occur in one or more observation periods (equivalent to dc = Undef in Ed1.1). * Does not appear when Ed1.1 is selected.
FAIL	FAIL
NoData	NoData

Selecting a Test Mode

- To perform a normal voltage fluctuation and flicker measurement (General mode), select General.
- To measure dmax caused by manual switching (Manual dmax mode), select Manual.
- You can also select both General and Manual.

Initializing the Measurement

- The initialization takes approximately 30 s.
- Rms voltage Un and voltage frequency Freq are updated every 2 s while the initialization is in progress in the same manner as when the voltage fluctuation and flicker measurement is reset.
- Keep the voltage of the power supply to be measured in steady-state condition while the initialization is in progress.

Rated Voltage Un and Voltage Frequency Freq

- If the assignment method of rated voltage is AUTO, the rms voltage at the start of measurement is used as rated voltage Un. The measured data is calculated with respect to rated voltage Un.
- If the assignment method of rated voltage is SET, the rated voltage setting is displayed as Un(Set).
- Rated voltage Un and voltage frequency Freq are not updated after the flicker measurement is started.

Resetting a Test

To initialize and restart the measurement, reset the measurement after the normal voltage fluctuation and flicker measurement is complete and the flicker measurement status is indicating Complete. You cannot initialize or start the measurement in the Complete status.
In addition, reset the measurement to change the measurement conditions of the normal voltage fluctuation and flicker measurement (section 3.3).

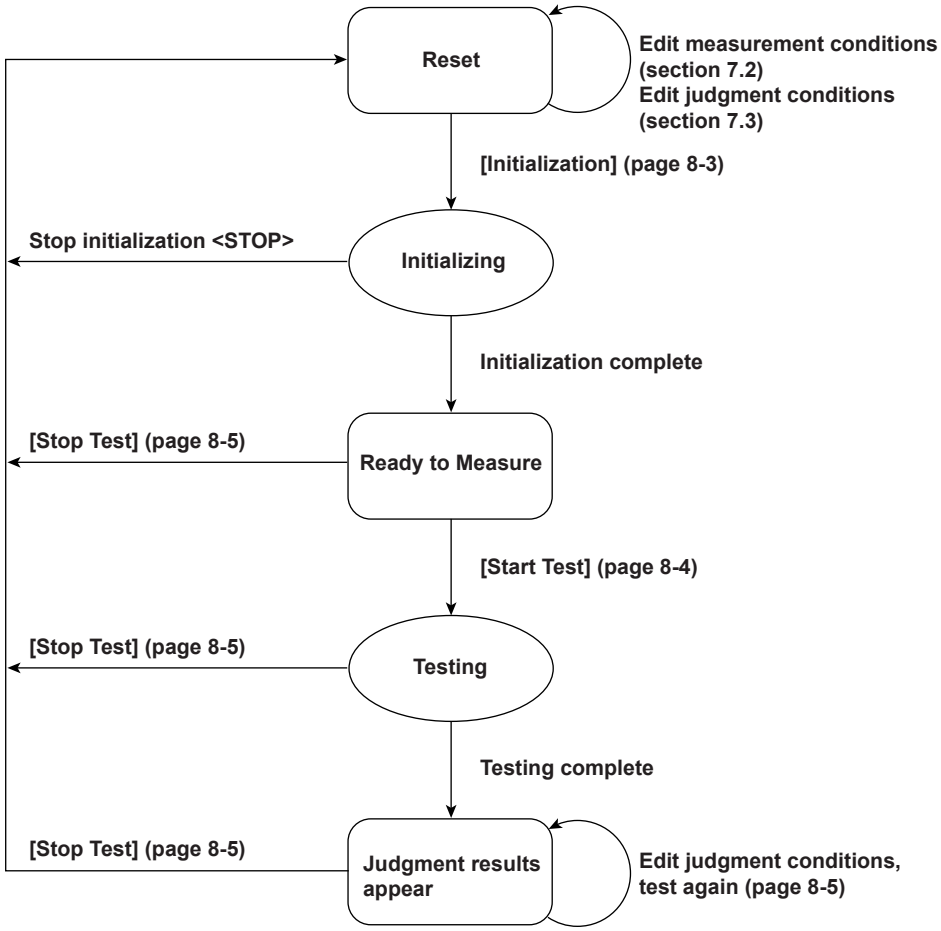
Flicker Measurement Status

The following five flicker measurement statuses are available.

Status	Meaning
Reset	Condition in which the measured value is reset and initialization can be executed.
Initializing	Initializing the measurement.
Ready	Initialized condition in which measurement can be started.
Start	Measurement in progress: Displays the elapsed time.
Complete	Displays the result (judgment by measurement item) and judgment (element judgment and overall judgment).

Normal Voltage Fluctuation and Flicker Measurement Flowchart

(Flicker Measurement Status Transitions)



Numbers in parenthesis indicate relevant sections or pages in the manual.
Brackets are used to indicate buttons or icons.
Greater than and less than signs are used to indicate buttons (i.e. <Stop Test>).

8.2 Executing the Measurement of dmax Caused by Manual Switching

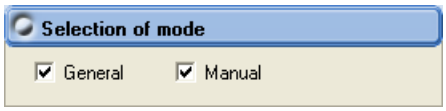
Measurement of dmax caused by manual switching is executed.
Measures the maximum relative voltage change, dmax, when the EUT switch is manually turned ON and OFF, determines the average over 24 measurements, and compares and judges against the limit.

Procedure

1. Select the icon in the menu area. The Measure submenu appears. For general information about the Measure submenu, see section 8.1.

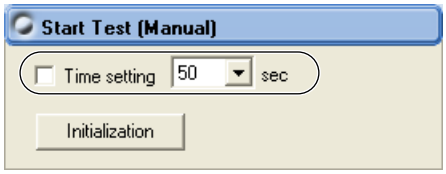
Selecting a Test Mode

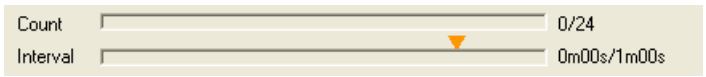
2. Select **Manual**.



Setting the Time Marker

3. Select the **Time setting** check box under Start Test (Manual). appears above the Interval bar in the upper portion of the setting and display area.
4. Set **Time setting** to 1 to 60 seconds.



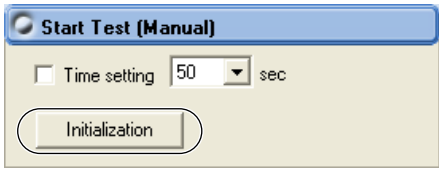


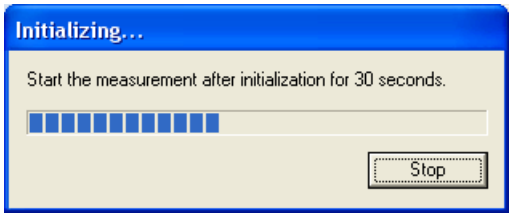
Starting a Compliancy Test

Check that the software is in On-Line mode and that the flicker measurement status is Reset (when the status is Reset, the measured values are reset and initialization can be performed). If the status is not Reset, follow the procedure described on page 8-19, “Resetting a Test,” to set the flicker measurement status to Reset.

Initializing a Test

Click **Initialization** under Start Test (Manual) or click the button. The initialization dialog box appears, and initialization begins.



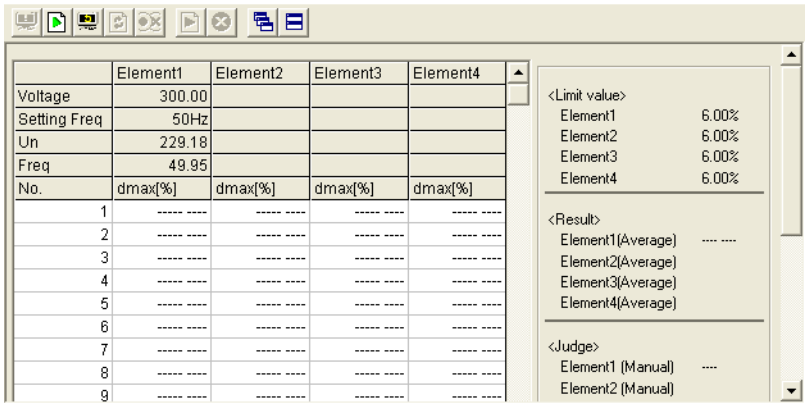


Once initialization is complete, the initialization dialog box will automatically close, and the Numeric View window will display:

- The current measured values for Un[V] and Freq[Hz].
- “----” for dmax[%].

Note

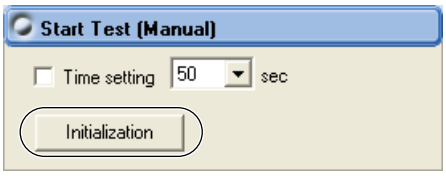
“----” will appear in every column for elements that you do not select under Measure Object in the Setting window.

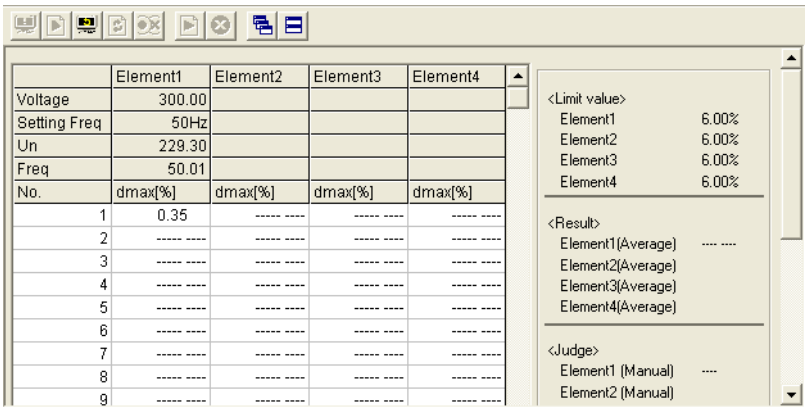


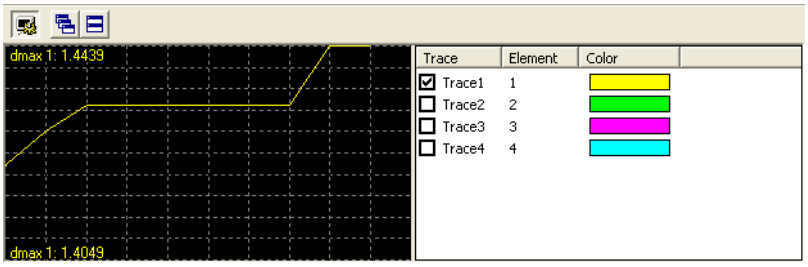
Starting a Test

1. Click **Start Test** under Start Test (Manual) or click the button. The Numeric View window will display:
   - Fixed values for Un[V] and Freq[Hz]
   - The maximum value for dmax during the current observation period in light blue.

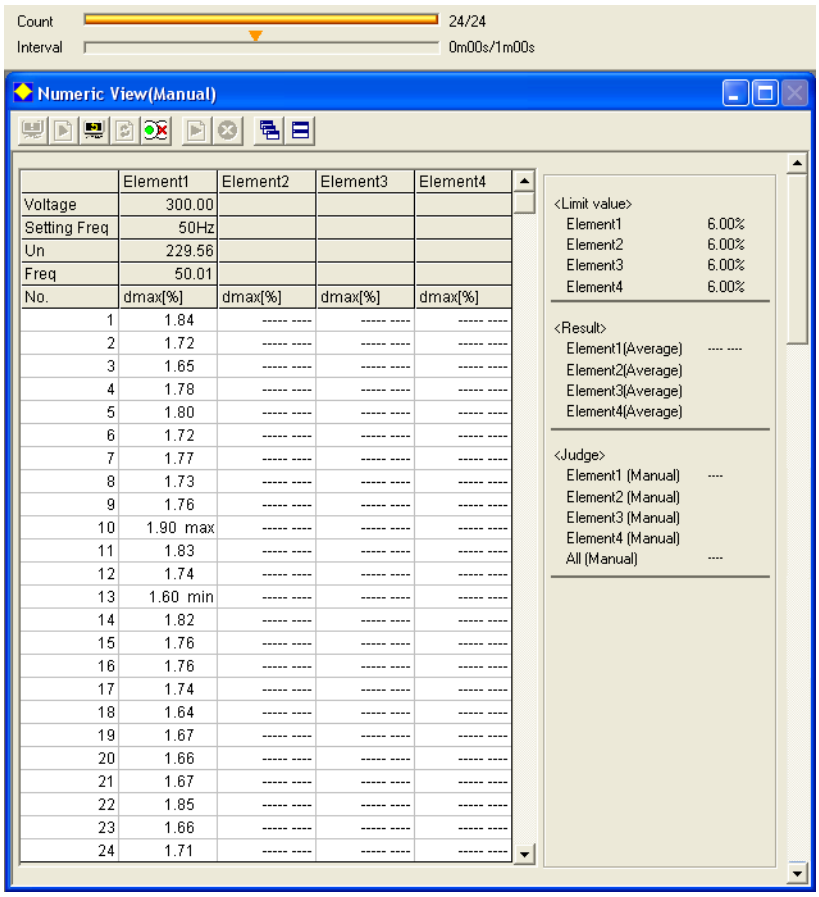
The bar and numbers next to Interval indicate how much time has passed. The bar and numbers next to Count indicate how many observation periods have finished. The measurement results appear in the Trend Graph View window.







2. Turn the EUT ON to achieve normal operation. Operate the EUT in the normal condition as long as possible in the measurement period of one observation period (1 minute).
3. Turn the EUT OFF before the measurement of one observation period (1 minute) completes. When the measurement of an observation period is complete, the measured result of the next number turns light blue.
4. Repeat steps 1 and 3 to measure dmax 24 times.



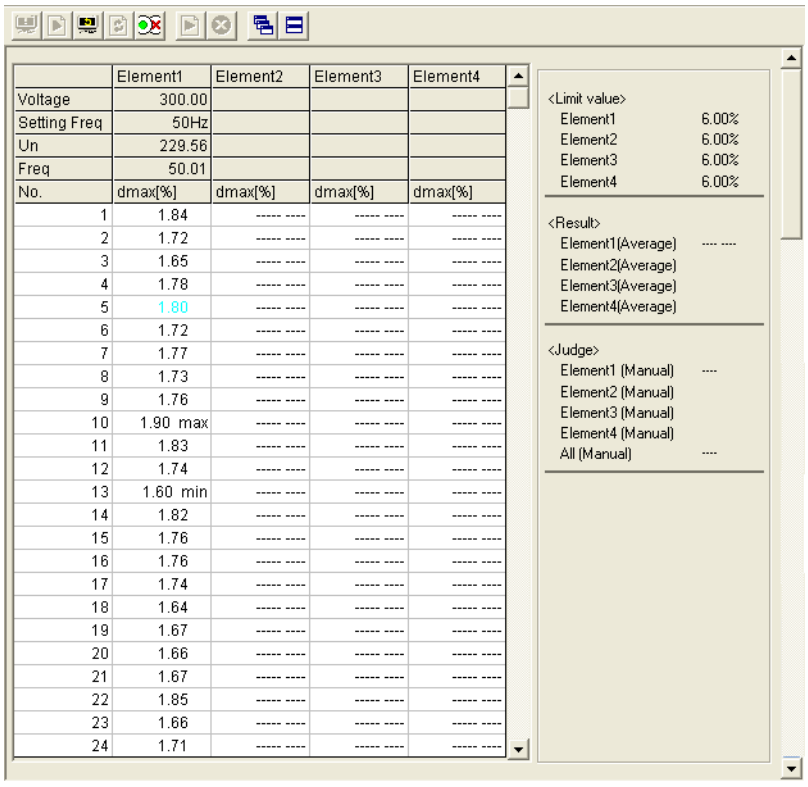
Remeasuring by Shifting the Observation Period

If a measurement of a given observation period is not performed correctly, you can change the observation period to be measured by carrying out to the procedure below and redo the measurement.

1. Click on the toolbar. The Move dialog box opens.
2. Select the number of the observation period you want to re-measure.

Note

You can only shift to and remeasure observation periods that have already been measured.

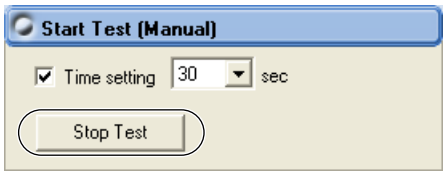


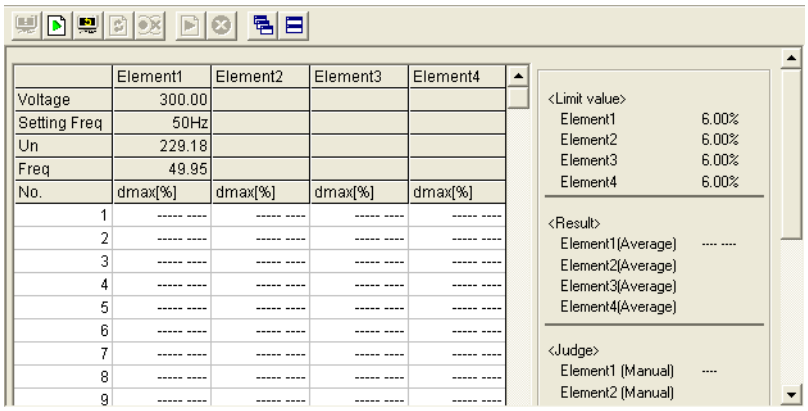
	Element1	Element2	Element3	Element4
Voltage	300.00			
Setting Freq	50Hz			
Un	229.56			
Freq	50.01			
No.	dmax[%]	dmax[%]	dmax[%]	dmax[%]
1	1.84	----- ----	----- ----	----- ----
2	1.72	----- ----	----- ----	----- ----
3	1.65	----- ----	----- ----	----- ----
4	1.78	----- ----	----- ----	----- ----
5	1.80	----- ----	----- ----	----- ----
6	1.72	----- ----	----- ----	----- ----
7	1.77	----- ----	----- ----	----- ----
8	1.73	----- ----	----- ----	----- ----
9	1.76	----- ----	----- ----	----- ----
10	1.90 max	----- ----	----- ----	----- ----
11	1.83	----- ----	----- ----	----- ----
12	1.74	----- ----	----- ----	----- ----
13	1.60 min	----- ----	----- ----	----- ----
14	1.82	----- ----	----- ----	----- ----
15	1.76	----- ----	----- ----	----- ----
16	1.76	----- ----	----- ----	----- ----
17	1.74	----- ----	----- ----	----- ----
18	1.64	----- ----	----- ----	----- ----
19	1.67	----- ----	----- ----	----- ----
20	1.66	----- ----	----- ----	----- ----
21	1.67	----- ----	----- ----	----- ----
22	1.85	----- ----	----- ----	----- ----
23	1.66	----- ----	----- ----	----- ----
24	1.71	----- ----	----- ----	----- ----

3. Carry out steps 2 to 4 to measure dmax.
   If you start the re-measurement, the measurement count and graph display shown in Count decrease by one. In addition, the total elapsed time of measurement decreases by one observation period. When the re-measurement is complete, the measured result of the observation period number that completed the measurement turns black.
4. If you want to continue with the measurement, repeat steps 2 to 4. To change the observation period to be measured, return to step 6.

Stopping a Test

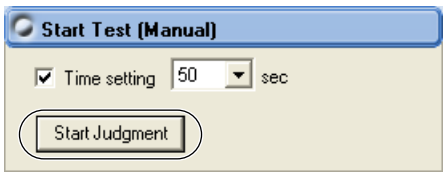
1. Click **Stop Test** under Start Test (Manual) or click the button.
Measurement stops. The measured data and test results are discarded, and Interval and Count in the Numeric View window are cleared.

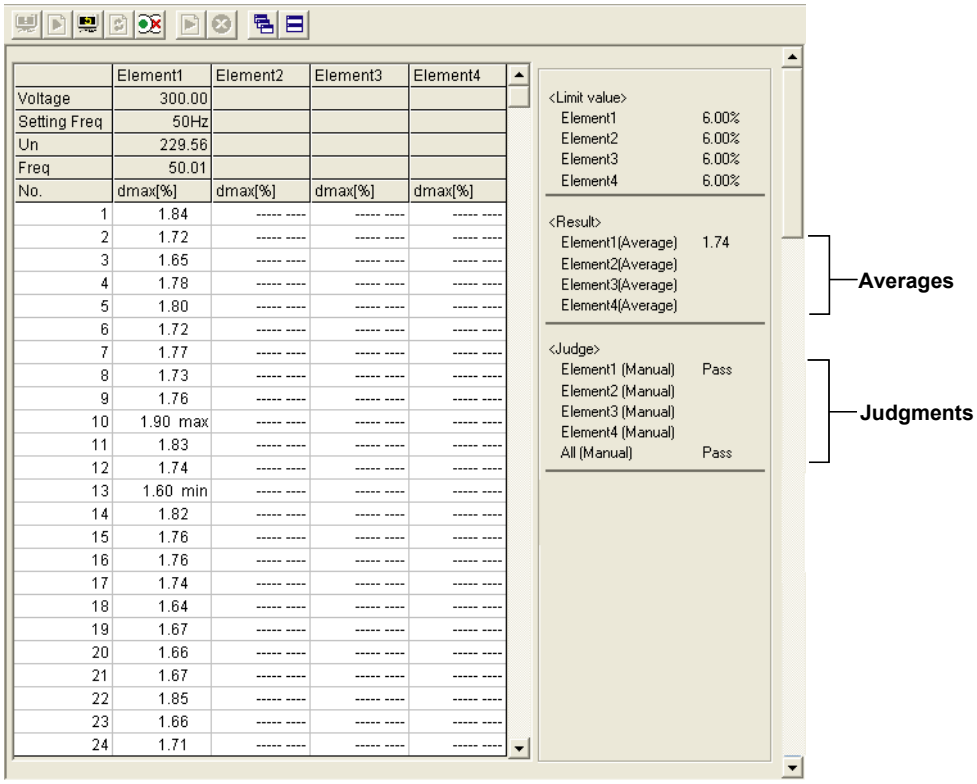




Completing the Measurement and Displaying the Judgment

1. Check that the measurement of all observation periods (24) is complete, and that the dmax data of each observation period is displayed.
2. Click **Start Judgment** under Start Test (Manual) or click the button. The dmax data of all observation periods is confirmed, and the measurement of dmax caused by manual switching is complete. The flicker measurement status changes to Complete, and the result and judgment of the average of the measured dmax are displayed.



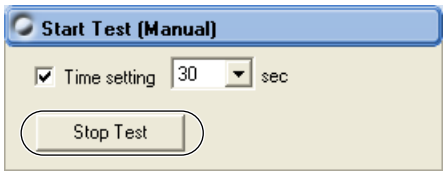


Changing the Judgment Conditions and Re-judging the Measured Data

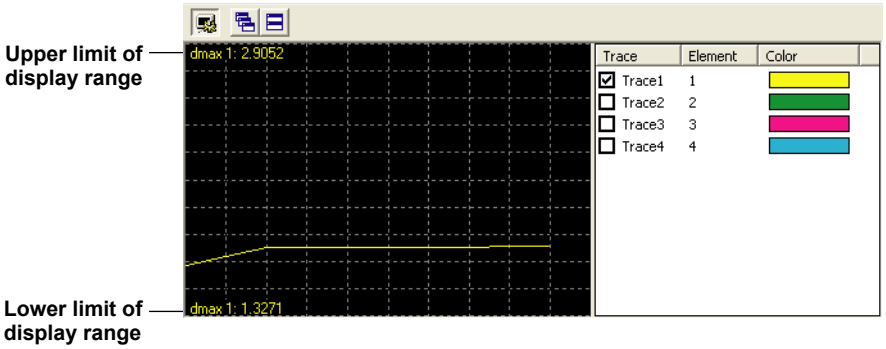
When the measurement of dmax caused by manual switching is complete, change the judgment conditions according to the procedure given in “Setting the Judgment Conditions” in section 3.4. If you change the judgment conditions, the average data of the measured dmax is re-judged, and the judgment is updated.

Resetting a Test

1. Click **Stop Test** under Start Test (General) or click the button.
Measurement is reset. The measured data and test results are discarded, and Interval and Count in the Numeric View window are cleared.



Setting the Trend Graph Traces



Trace

Select the trends you want to display (select or clear the check boxes).
Up to 16 trends can be displayed.

Element

Select the element to be displayed.

1. Click on the **Element** column. A combo box opens.
2. Select the element.

Color

Select the display color of the trend.

1. Click on the **Color** column. A combo box opens.
2. Select the display color of the trend.

Explanation

Time Marker

One way you can use the time marker is as a reminder of when to turn OFF the power supply of an EUT that does not turn OFF immediately after it is switched OFF.

appears above the Interval bar at the top of the setting and display area when you select the Time setting check box.

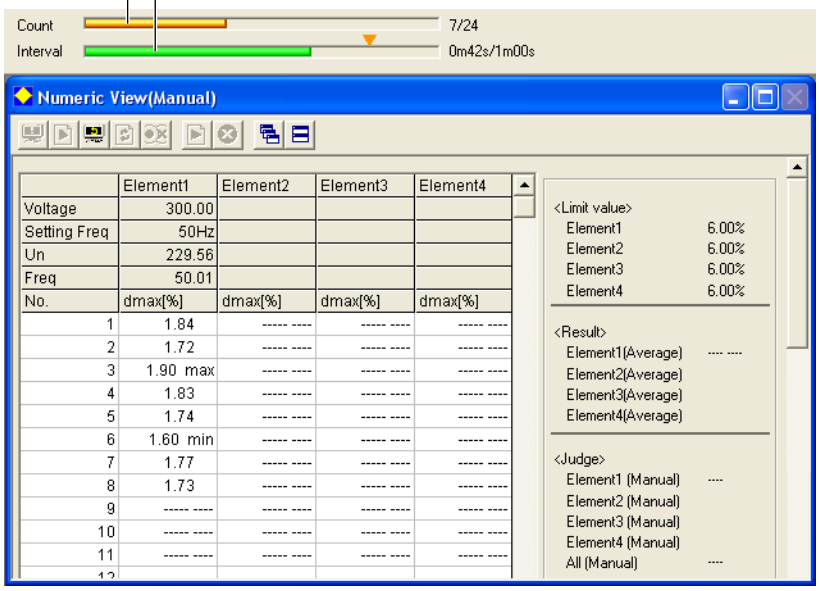
You can set the time marker to a value from 1 to 60 seconds.

Display during Measurement

The figure below is a display example of the measurement of dmax caused by manual switching in progress.

The number of completed observation periods, indicated with numbers and a progress bar.

The amount of time that has elapsed since the start of the current observation period, indicated with numbers and a progress bar.



Observation period being measured

The dmax value being observed are displayed in light blue. The displayed value is the largest value up to that point.

If the instantaneous value every 2 s exceeds the maximum value, the value is updated.

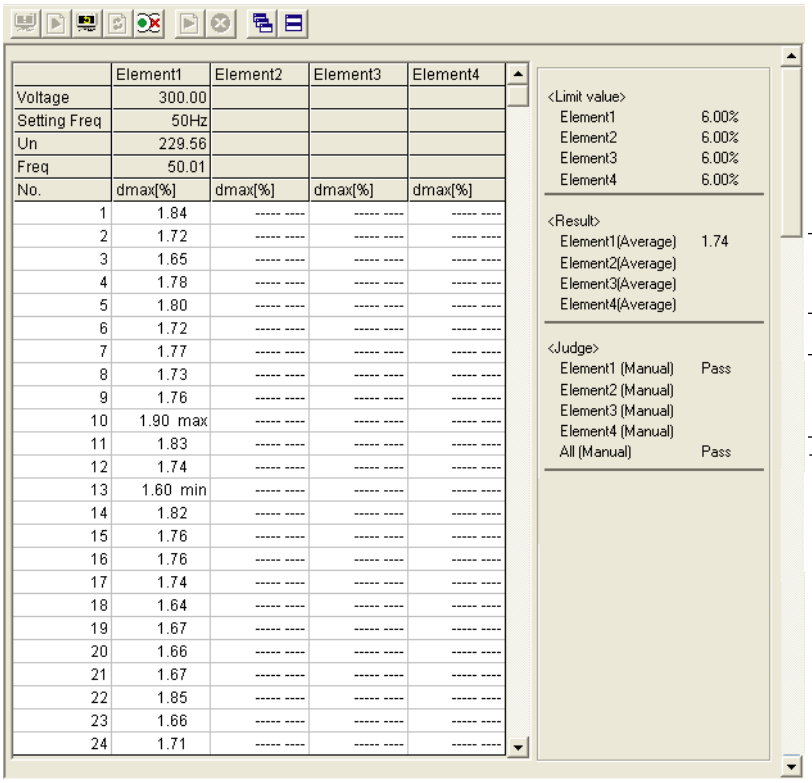
Observation periods that have finished the measurement

Displays the dmax value of each observation period for which the measurement has been completed.

The maximum and minimum values over all observation periods are indicated as max and min, respectively.

Judgment Display When the Measurement Is Complete

The figure below is a display example when the measurement of dmax caused by manual switching is complete.



	Element1	Element2	Element3	Element4
Voltage	300.00			
Setting Freq	50Hz			
Un	229.56			
Freq	50.01			
No.	dmax[%]	dmax[%]	dmax[%]	dmax[%]
1	1.84	----- ----	----- ----	----- ----
2	1.72	----- ----	----- ----	----- ----
3	1.65	----- ----	----- ----	----- ----
4	1.78	----- ----	----- ----	----- ----
5	1.80	----- ----	----- ----	----- ----
6	1.72	----- ----	----- ----	----- ----
7	1.77	----- ----	----- ----	----- ----
8	1.73	----- ----	----- ----	----- ----
9	1.76	----- ----	----- ----	----- ----
10	1.90 max	----- ----	----- ----	----- ----
11	1.83	----- ----	----- ----	----- ----
12	1.74	----- ----	----- ----	----- ----
13	1.60 min	----- ----	----- ----	----- ----
14	1.82	----- ----	----- ----	----- ----
15	1.76	----- ----	----- ----	----- ----
16	1.76	----- ----	----- ----	----- ----
17	1.74	----- ----	----- ----	----- ----
18	1.64	----- ----	----- ----	----- ----
19	1.67	----- ----	----- ----	----- ----
20	1.66	----- ----	----- ----	----- ----
21	1.67	----- ----	----- ----	----- ----
22	1.85	----- ----	----- ----	----- ----
23	1.66	----- ----	----- ----	----- ----
24	1.71	----- ----	----- ----	----- ----

Judgment of the average of dmax
Displays the average of 22 dmax values excluding the maximum and minimum values. The value is compared to the limit, and the judgment (pass or fail) is displayed.

Element judgment
Displays the judgment of the average of dmax for the element whose measured data is displayed.

Total judgment
If the judgment of all elements being measurement is pass, Pass is indicated. Otherwise, Fail is indicated.

Note

If an element that is not being measured is assigned to a display target element, Off is displayed by the element number, and all measured data are displayed as blank.

Initializing the Test

- The initialization takes approximately 30 s.
- Rms voltage Un and voltage frequency Freq are updated every 2 s while the initialization is in progress in the same manner as when the voltage fluctuation and flicker measurement is reset.
- Keep the voltage of the power supply to be measured in steady-state condition while the initialization is in progress.

Rated Voltage Un and Voltage Frequency Freq

- If the assignment method of rated voltage is AUTO, the rms voltage at the start of the first measurement is used as rated voltage Un. The measured data is calculated with respect to rated voltage Un.
- If the assignment method of rated voltage is SET, the rated voltage setting is displayed as Un(Set).
- Rated voltage Un and voltage frequency Freq are fixed to the first measured values after the measurement of dmax caused by manual switching is started and are not updated.

Resetting the Test

To initialize and restart the measurement, reset the measurement after the measurement of dmax caused by manual switching is complete and the flicker measurement status is indicating Complete. You cannot initialize or start the measurement in the Complete status.

In addition, reset the measurement to change the measurement conditions of the the measurement of dmax caused by manual switching (section 3.3).

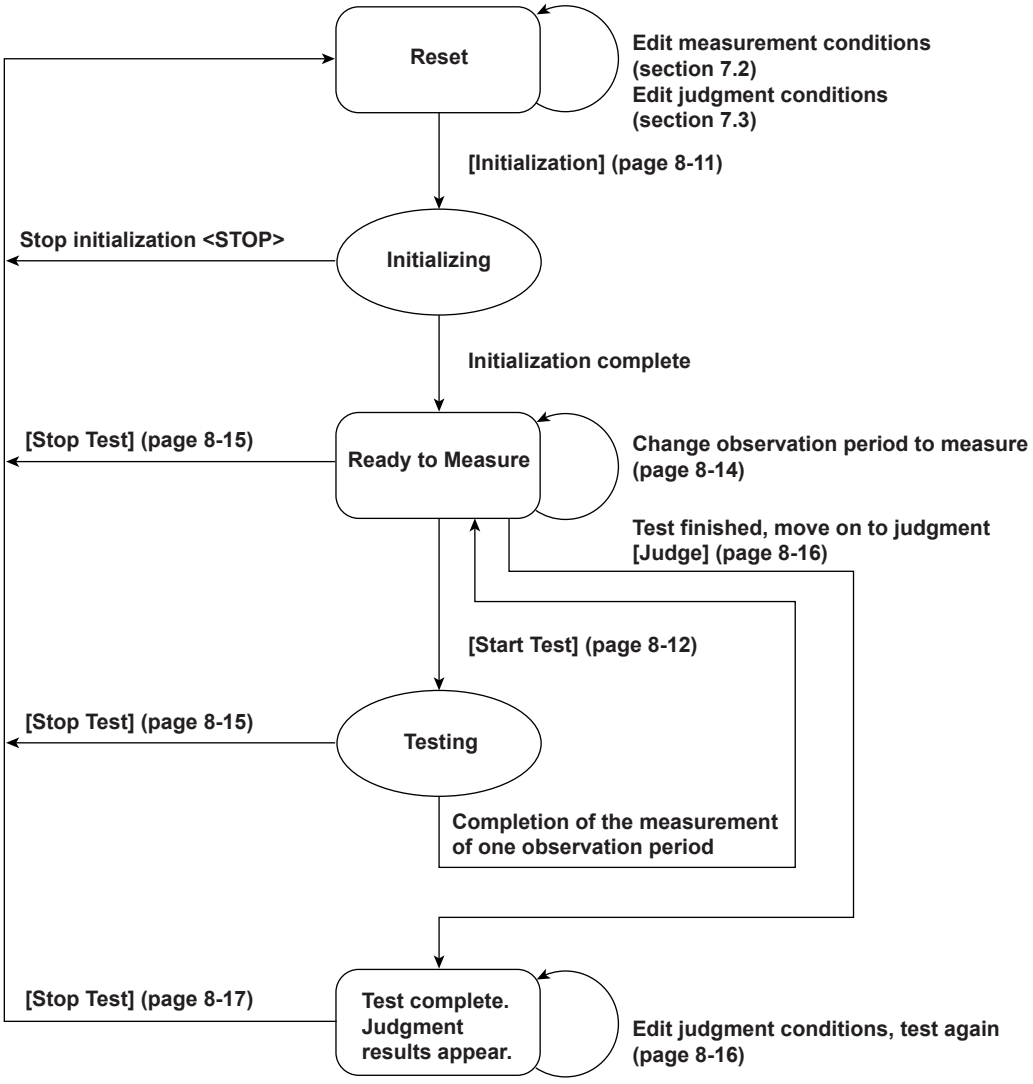
Flicker Measurement Status

The following five flicker measurement statuses are available.

Status	Meaning
Reset	Condition in which the measured value is reset and initialization can be executed.
Initializing	Initializing the measurement.
Ready	Initialized condition in which measurement can be started.
Start	Measurement in progress: Displays the elapsed time.
Complete	Displays the result (judgment by measurement item) and judgment (element judgment and overall judgment).

Flow Chart of the Measurement of dmax Caused by Manual Switching

(Transition Diagram of the Flicker Measurement Status)

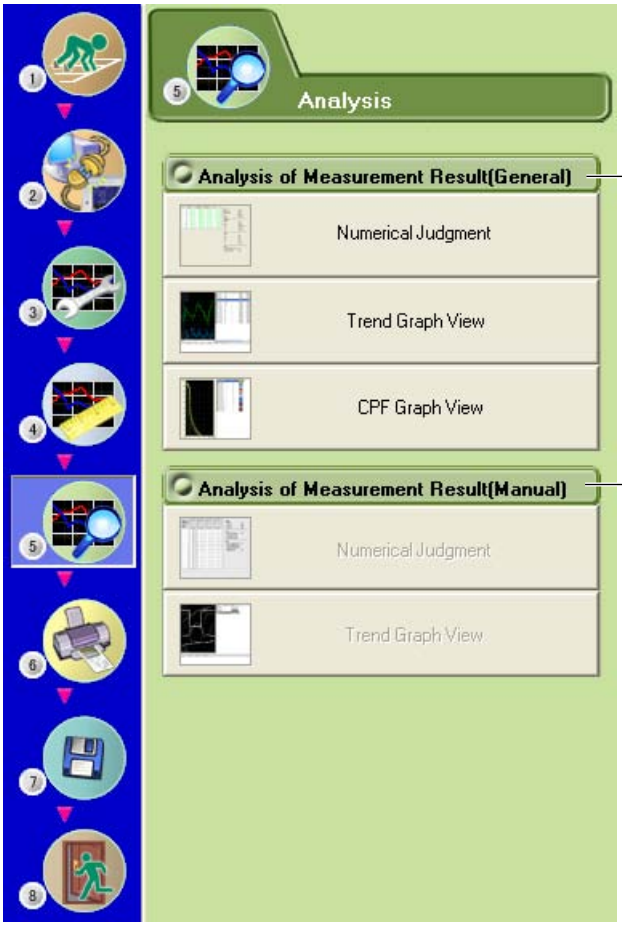


Numbers in parenthesis indicate relevant sections or pages in the manual.
Brackets are used to indicate buttons or icons.
Greater than and less than signs are used to indicate buttons (i.e. <Stop Test>).

9.1 Displaying Numerical Judgments

Procedure

1. Select the icon in the menu area. The Analysis submenu appears.



Analysis of Measurement Result (General)
You can view normal voltage fluctuation and flicker measurement (General mode) results using the following displays:
- Numerical judgment (page 9-2)
- Trend graph (section 9.2)
- CPF graph (section 9.3)

Analysis of Measurement Result (Manual)
You can view measurement of dmax caused by manual switching (Manual dmax mode) results using the following displays:
- Numerical judgment (page 9-3)
- Trend graph (section 9.3)

Window arrangement buttons
For details, see chapter 12.

Displays cascaded windows

Displays tiled windows

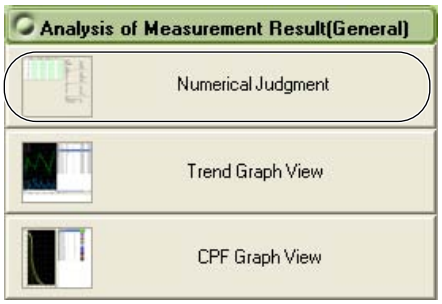
Note

Notes when switching to the Measure window

While in the Analysis window, if you click the Measure icon and switch to the Measure window, the measured data will be discarded. Save the data if you do not want it to be discarded (see chapter 11 for information on how to save data).

Displaying Numerical Judgments for Normal Voltage Fluctuation and Flicker Measurements (General Mode)

2. Click **Numerical Judgment** under Analysis of Measurement Result (General). The numerical judgment display window will appear and show numerical values and judgments for the selected element.



3. Click , and select which element's numerical judgment you want to display.

Note

- You can only select Numeric Data and Judgment in Off-Line mode with the measured data loaded.
- In On-Line mode, the numeric data and judgment view is displayed for the element that is selected in the measurement conditions of the WT.

Normal Voltage Fluctuation and Flicker Measurement

Measured value and judgment for each observation period

No.	dc[%]	dmax[%]	d(t)[ms]	Pst
1	0.00 Pass	0.00 Pass	----- ----	0.00 Pass
2	0.00 Pass	0.00 Pass	----- ----	0.00 Pass
3	0.00 Pass	0.00 Pass	----- ----	0.00 Pass
4	0.00 Pass	0.00 Pass	----- ----	0.00 Pass
5	0.00 Pass	0.00 Pass	----- ----	0.00 Pass
6	0.00 Pass	0.00 Pass	----- ----	0.00 Pass
7	0.00 Pass	0.00 Pass	----- ----	0.00 Pass
8	0.00 Pass	0.00 Pass	----- ----	0.00 Pass
9	0.00 Pass	0.00 Pass	----- ----	0.00 Pass
10	0.00 Pass	0.00 Pass	----- ----	0.00 Pass
11	0.00 Pass	0.00 Pass	----- ----	0.00 Pass
12	0.00 Pass	0.00 Pass	----- ----	0.00 Pass

Element	1
Voltage Range	300.00V
Setting	50Hz
Un	229.81V
Frequency	50.01Hz
<Limit Value>	
dc	3.30%
dmax	4.00%
d(t)	-----
Pst	1.00%
Plt	0.65% 12N
<Result>	
dc	Pass
dmax	Pass
d(t)	-----
Pst	Pass
Plt	0.12 Pass
<Judgment>	
Element (General)	Pass
All (General)	Pass

Measurement conditions

Limit

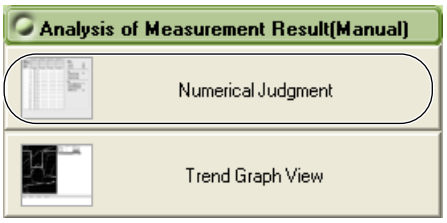
Judgment by measurement item

Element judgment

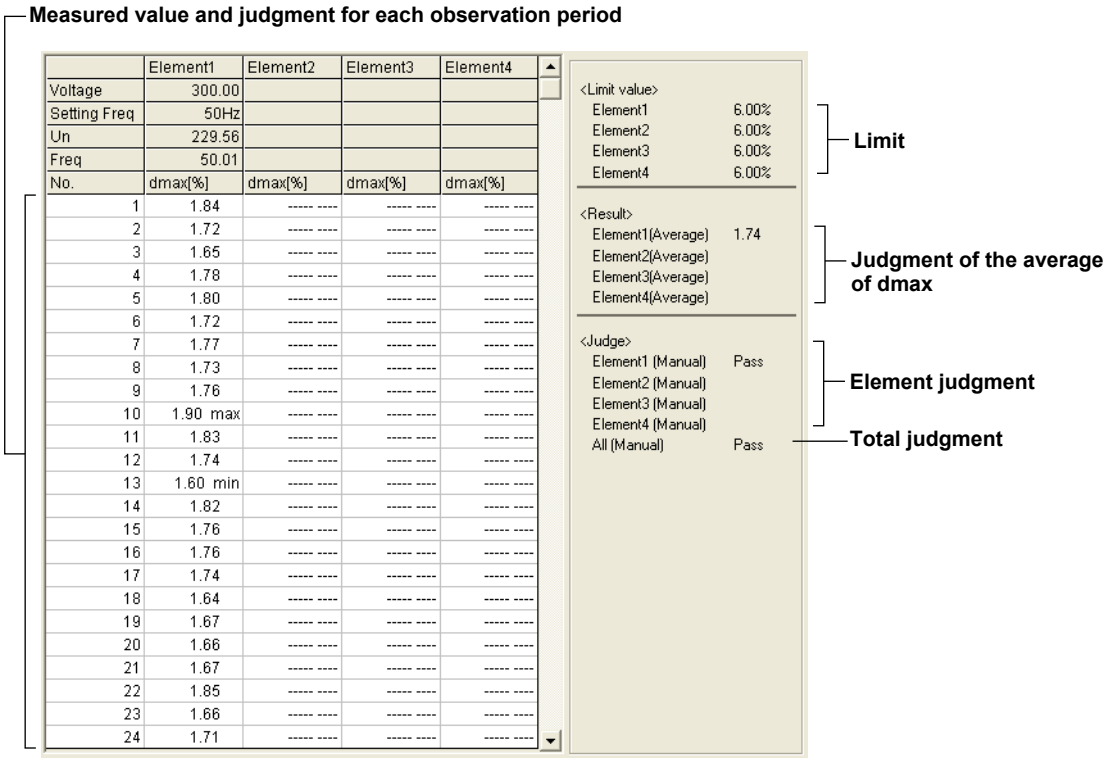
Total judgment

Displaying Numerical Judgments for Measurements of dmax Caused by Manual Switching (Manual dmax mode)

2. Click **Numerical Judgment** under Analysis of Measurement Result (Manual). The numerical judgment display window will appear and show numerical values and judgments for each element that was measured.



Measurement of dmax Caused by Manual Switching



	Element1	Element2	Element3	Element4
Voltage	300.00			
Setting Freq	50Hz			
Un	229.56			
Freq	50.01			
No.	dmax[%]	dmax[%]	dmax[%]	dmax[%]
1	1.84	----- ----	----- ----	----- ----
2	1.72	----- ----	----- ----	----- ----
3	1.65	----- ----	----- ----	----- ----
4	1.78	----- ----	----- ----	----- ----
5	1.80	----- ----	----- ----	----- ----
6	1.72	----- ----	----- ----	----- ----
7	1.77	----- ----	----- ----	----- ----
8	1.73	----- ----	----- ----	----- ----
9	1.76	----- ----	----- ----	----- ----
10	1.90 max	----- ----	----- ----	----- ----
11	1.83	----- ----	----- ----	----- ----
12	1.74	----- ----	----- ----	----- ----
13	1.60 min	----- ----	----- ----	----- ----
14	1.82	----- ----	----- ----	----- ----
15	1.76	----- ----	----- ----	----- ----
16	1.76	----- ----	----- ----	----- ----
17	1.74	----- ----	----- ----	----- ----
18	1.64	----- ----	----- ----	----- ----
19	1.67	----- ----	----- ----	----- ----
20	1.66	----- ----	----- ----	----- ----
21	1.67	----- ----	----- ----	----- ----
22	1.85	----- ----	----- ----	----- ----
23	1.66	----- ----	----- ----	----- ----
24	1.71	----- ----	----- ----	----- ----

<Limit value>
Element1 6.00%
Element2 6.00%
Element3 6.00%
Element4 6.00%

<Result>
Element1(Average) 1.74
Element2(Average)
Element3(Average)
Element4(Average)

<Judge>
Element1 (Manual) Pass
Element2 (Manual)
Element3 (Manual)
Element4 (Manual)
All (Manual) Pass

Explanation

Measurement Conditions

The element number for which the measured data is displayed, the voltage, the rated voltage (Un), the target frequency (specified frequency), the voltage frequency, and the measurement interval of each observation period are displayed.

Limit

- Displays dc, dmax, d(t), Pst, and Plt for normal voltage fluctuation and flicker measurement.
- Displays dmax for measurement of dmax caused by manual switching.

Measured Value and Judgment for Each Observation Period

Normal Voltage Fluctuation and Flicker Measurement

- The final values of dc, dmax, and d(t) are compared with the respective limits, and the judgment (pass or fail) is displayed to the right of the final value.
- If a steady-state condition does not occur during the measurement period, it is considered to be a fluctuating condition. The measured value of dc is displayed as Undef (undefined, Ed1.1) or 0 (Ed2.0), and the judgment is displayed as Error (Ed1.1) or Pass (Ed2.0).
- The short-term flicker value, Pst, is calculated, compared to the limit, and the judgment (pass or fail) is displayed.
- The judgment of items whose judgment is turned OFF is displayed as Undef.

Measurement of dmax Caused by Manual Switching

The words max and min are indicated to the right of the maximum and minimum dmax values over all observation periods, respectively.

Judgment by Measurement Item (Normal Voltage Fluctuation and Flicker Measurement)

- If the judgment of dc, dmax, d(t), and Pst is pass for all observation periods, Pass is indicated. Otherwise, Fail is indicated. The items whose judgment is turned OFF are displayed as Undef.
- Compares the long-term flicker value, Plt, to the limit, and displays the judgment (pass or fail). The items whose judgment is turned OFF are displayed as Undef.

Judgment of the Average of dmax (Measurement of dmax Caused by Manual Switching)

Displays the average of 22 dmax values excluding the maximum and minimum values. The values are compared with limit, and the judgment (pass or fail) is displayed.

Element Judgment

Normal Voltage Fluctuation and Flicker Measurement

For elements whose measured data is displayed, if the judgment of all items whose judgment is turned ON is pass, Pass is indicated. Otherwise, Fail is indicated. However, if dc is error, Error is indicated.

Measurement of dmax Caused by Manual Switching

Displays the judgment of the average of dmax for the element whose measured data is displayed.

Overall Judgment

If the judgment of all elements being measurement is pass, Pass is indicated. Otherwise, Fail is indicated. However, if dc is error, Error is indicated in normal voltage fluctuation and flicker measurement.

Selecting the Element for Displaying the Measured Data

You can select the element from below. The selectable items vary depending on the installed elements.

Element1, Element2, Element3, and Element4

Note

If an element that is not being measured is assigned to a display target element, Off is displayed by the element number, and all measured data are displayed as blank.

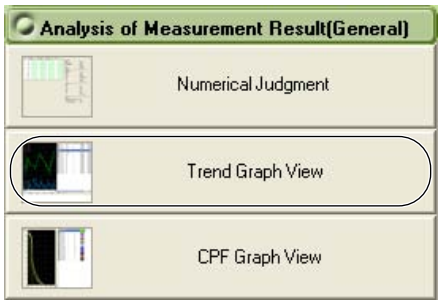
9.2 Displaying Trend Graphs

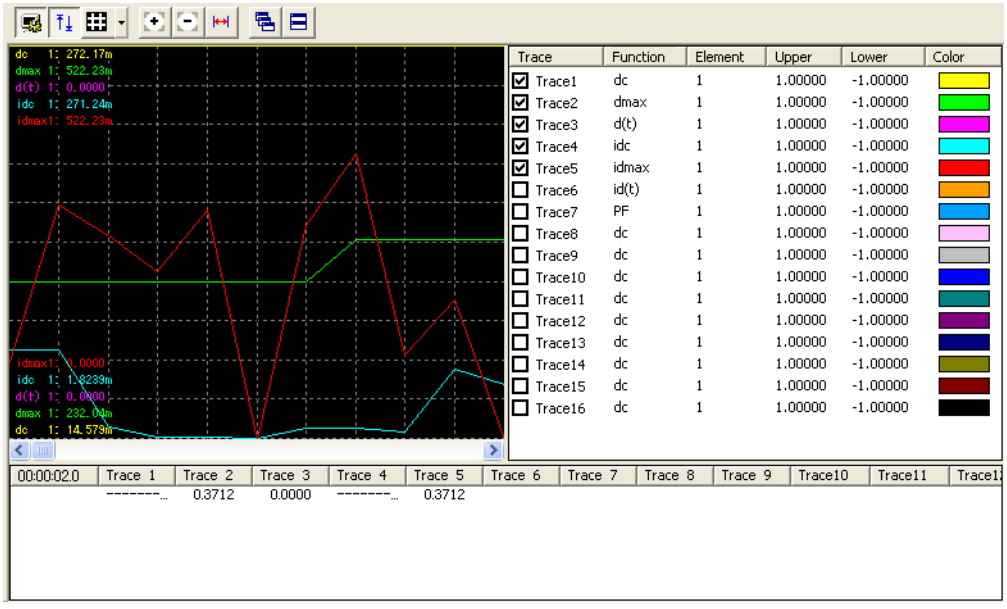
Procedure

1. Select the icon in the menu area. The Analysis submenu appears. For general information about the Analysis submenu, see section 9.1.

Displaying Trend Graphs for Normal Voltage Fluctuation and Flicker Measurements (General Mode)

2. Click **Trend Graph View** under Analysis of Measurement Result (General). The trend graph display window appears.



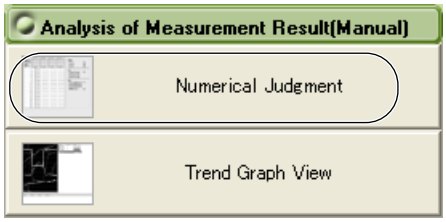


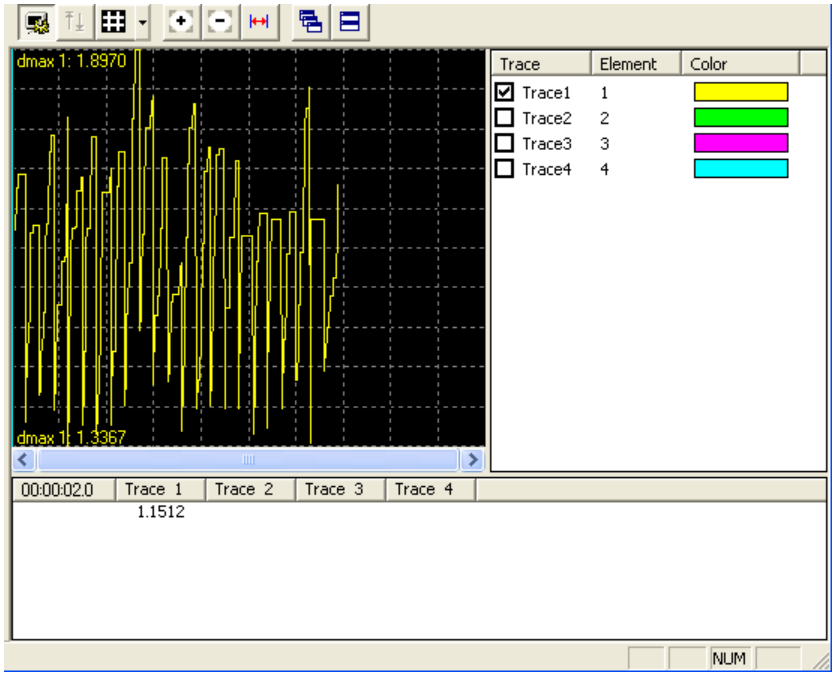
Note

- You can only select Trend Graph View in Off-Line mode with the measured data loaded.
- If you change the size of the trend window while the trend graph is displayed, the size of the trend display area also changes.

Displaying Trend Graphs for Measurements of dmax Caused by Manual Switching (Manual dmax mode)

2. Click **Trend Graph View** under Analysis of Measurement Result (Manual). The trend graph display window appears.





Note

- You can only select Trend Graph View in Off-Line mode with the measured data loaded.
- If you change the size of the trend window while the trend graph is displayed, the size of the trend display area also changes.

Setting the Trend Graph

The figure below is a display example of normal voltage fluctuation and flicker measurement in progress.

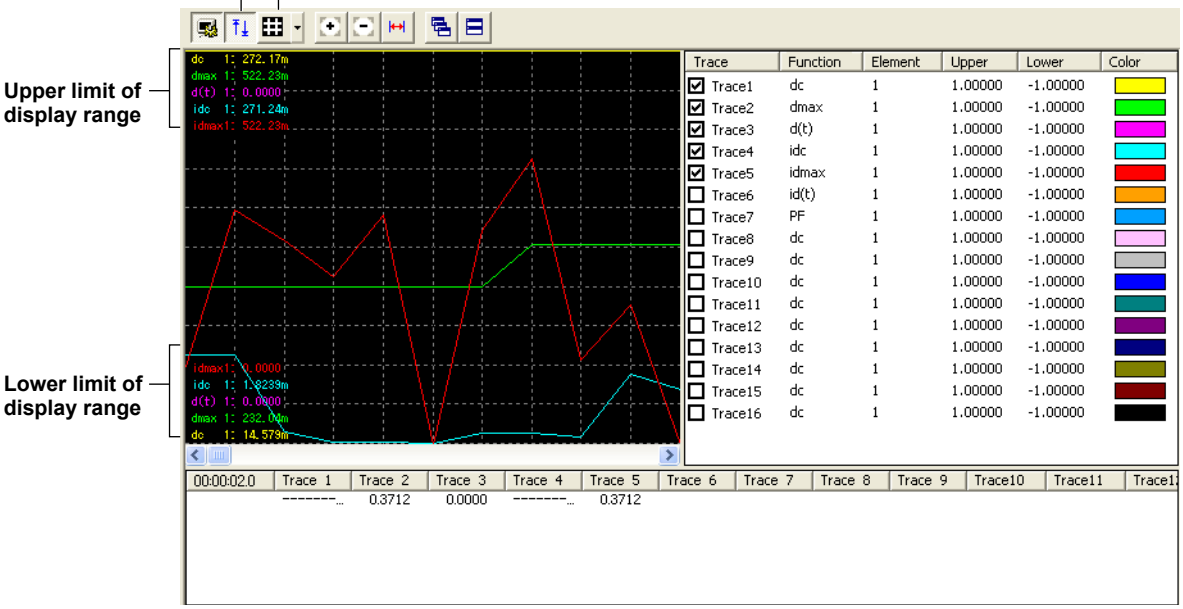
Auto Ranging

- **If the Auto Ranging Button Is Selected**
  The range automatically switches according to the retrieved value.
- **If the Auto Ranging Button Is Not Selected**
  If you click the Upper or Lower column, a combo box is displayed. You can set the Upper limit and Lower limit of the display range for each trend (trace).

Graticule

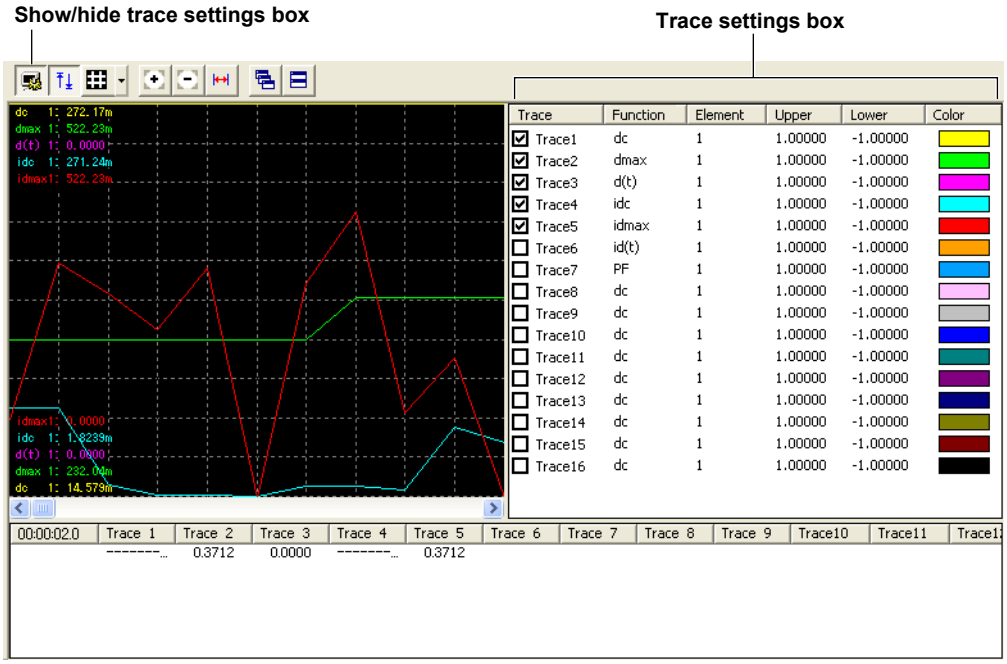
Select the grid type to be displayed in the trend display area (Dotted, Line, or None).

- Dotted: Use dotted lines for the grid.
- Line: Use lines for the grid.
- None: Not display the grid.



Setting the Trace

The figure below is a display example of normal voltage fluctuation and flicker measurement in progress.



Trace

Select the trends you want to display (select or clear the check boxes).

Function

Select the measurement function to be displayed. You can only select what measurement functions to display for normal voltage fluctuation and flicker measurement (General mode). In Manual dmax mode (measurement of dmax caused by manual switching), the only function that is displayed is dmax.

1. Click on the **Function** column. A combo box opens.
2. Select the measurement function.

Note

- You can select from the following measurement functions.
  - dc Relative steady-state voltage change
  - dmax Maximum relative voltage change
  - d(t) Period during which relative voltage change exceeds the threshold level
  - idc Instantaneous relative steady-state voltage change
  - idmax Instantaneous maximum relative voltage change
  - id(t) Period during which instantaneous relative voltage change exceeds the threshold level
  - PF Instantaneous flicker sensation (IFS)
- The measured value for PF is displayed at every 10-ms interval.
- The measured values for all measurement functions other than PF are displayed at every 2-s interval.

Element

Select the element to be displayed.

1. Click on the **Element** column. A combo box opens.
2. Select the element.

Upper and Lower

If the Auto Ranging check box is not selected, set the Upper and Lower limit of the display range for normal voltage fluctuation and flicker measurement (General mode). In Manual dmax mode (measurement of dmax caused by manual switching), the display range of the trend display is fixed to auto range.

1. Click the **Upper** or **Lower** column. A combo box opens.
2. Set the upper or lower limit value of the display range.

Color

Select the display color of the trend.

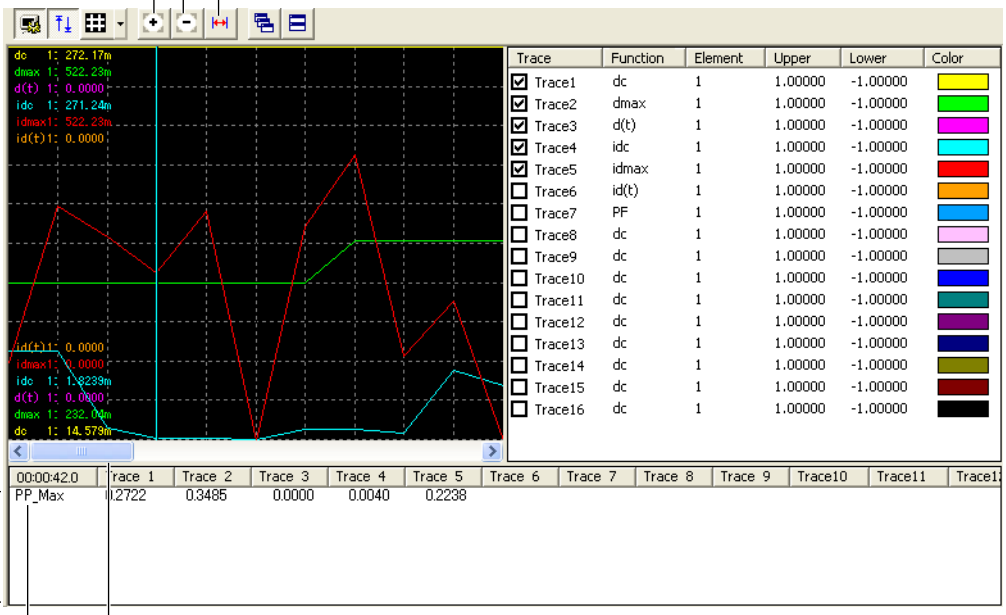
1. Click on the **Color** column. A combo box opens.
2. Select the display color of the trend.

Zooming In/Out

Zoom in
Each time you click Zoom+, the display is magnified. You can zoom up to a display time of 2 s in the trend display area.

Zoom out
Each time you click Zoom-, the display is reduced. You can zoom out to the elapsed time in the trend display area.

Display all: Displays the whole measurement time



Slider
Drag the slider to the desired time position on the waveform.

PP_Max
In the trend display, if not all the measured values can be displayed because the specified time axis value is set too high, measured values are P-P compressed and displayed.*
When this occurs, PP_Max is displayed here. For example, if the measured values for PF are being displayed but the measured values for every 10-ms interval will not fit on the trend graph, the P-P compressed measured values are displayed.
To display values without P-P compression, zoom in on the time axis.

* P-P Compression (Peak-to-Peak Compression)
In P-P compression, a maximum and minimum value are extracted from the values measured over a given period of time and are used to produce a compressed measured value.
For details, see section 2.7 of the WT3000 User's Manual (IM760301-01E).

Cursor
Click in the trend display area to show the cursor at the clicked position.
You can drag the displayed cursor.

Note

When you zoom in on the time axis display, you can move the cursor in 10-ms intervals. The measured data at the cursor location will be displayed in the following ways:

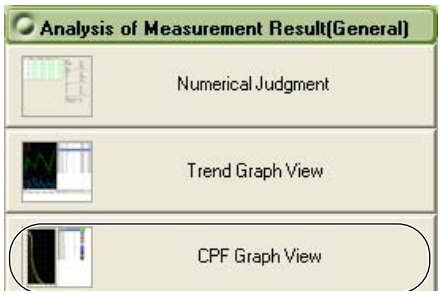
- The measured value for PF is displayed at every 10-ms interval.
- The measured values for all measurement functions other than PF are displayed using values interpolated from the data measured at every 2-s interval.

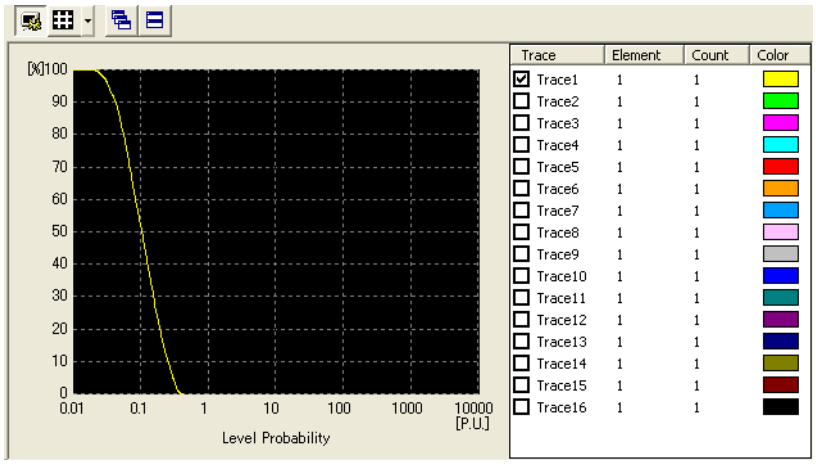
9.3 Displaying a CPF Graph

1. Select the icon in the menu area. The Analysis submenu appears. For general information about the Analysis submenu, see section 9.1.

Displaying a CPF Graph for Normal Voltage Fluctuation and Flicker Measurements (General Mode)

2. Click **CPF Graph View** under Analysis of Measurement Result (General). The CPF graph display window appears.

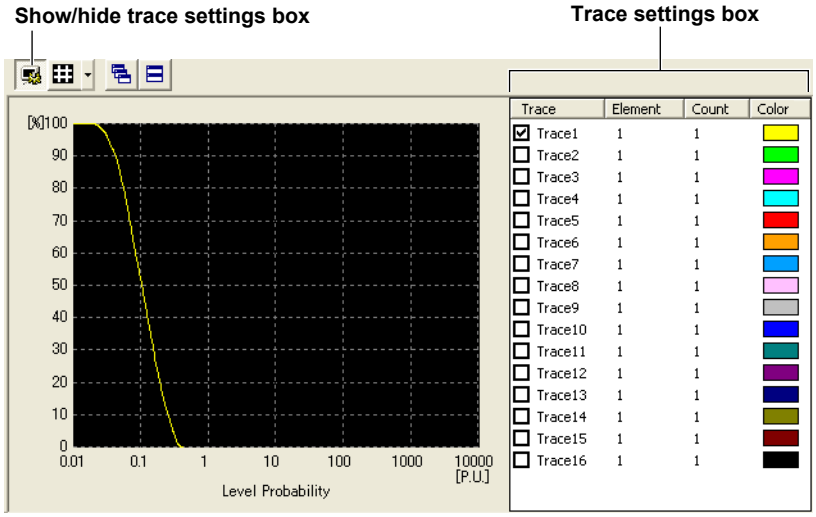




Note

- This view is available only for normal voltage fluctuation and flicker measurement.
- You can only select CPF Graph View in Off-Line mode with the measured data loaded.
- The CPF graph is displayed for each observation period selected by the period number.
- You cannot display the CPF graph during measurement.

Setting the Trace



Trace

Select the trends you want to display (select or clear the check boxes).

Element

Select the element to be displayed.

1. Click on the **Element** column. A combo box opens.
2. Select the element.

Color

Select the display color of the trend.

1. Click on the **Color** column. A combo box opens.
2. Select the display color of the trend.

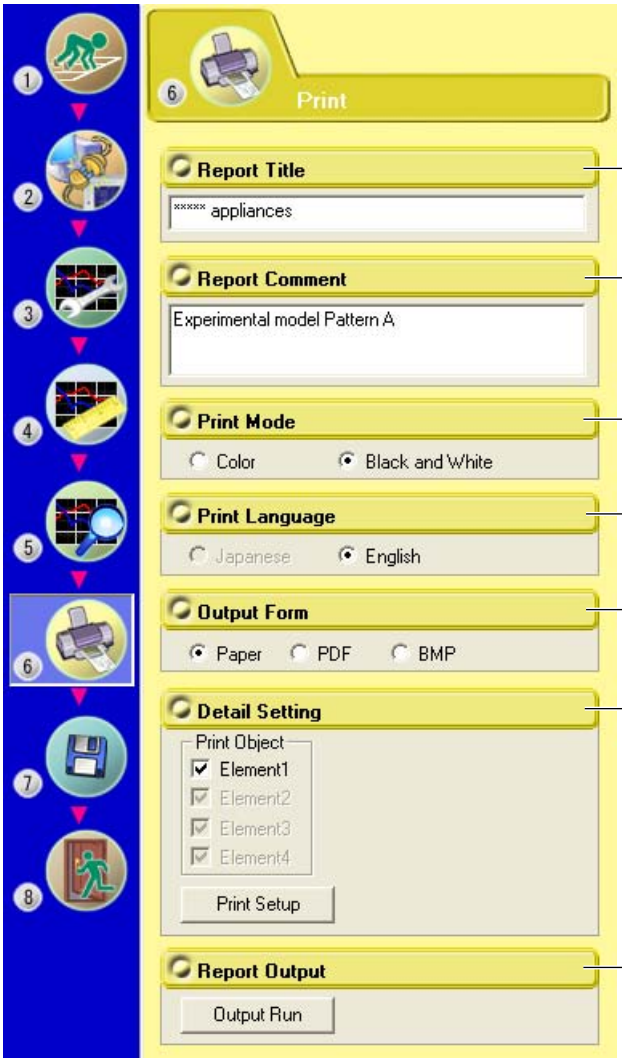
Count

Selects the observation period to be displayed on the CPF graph.
If you select a non-existing observation period, the waveform is not displayed.

10.1 Setting a Report's Title and Comments

Procedure

1. Select the icon in the menu area. The Print submenu appears.



Enter the report title (page 10-2).

Enter report comments (page 10-2).

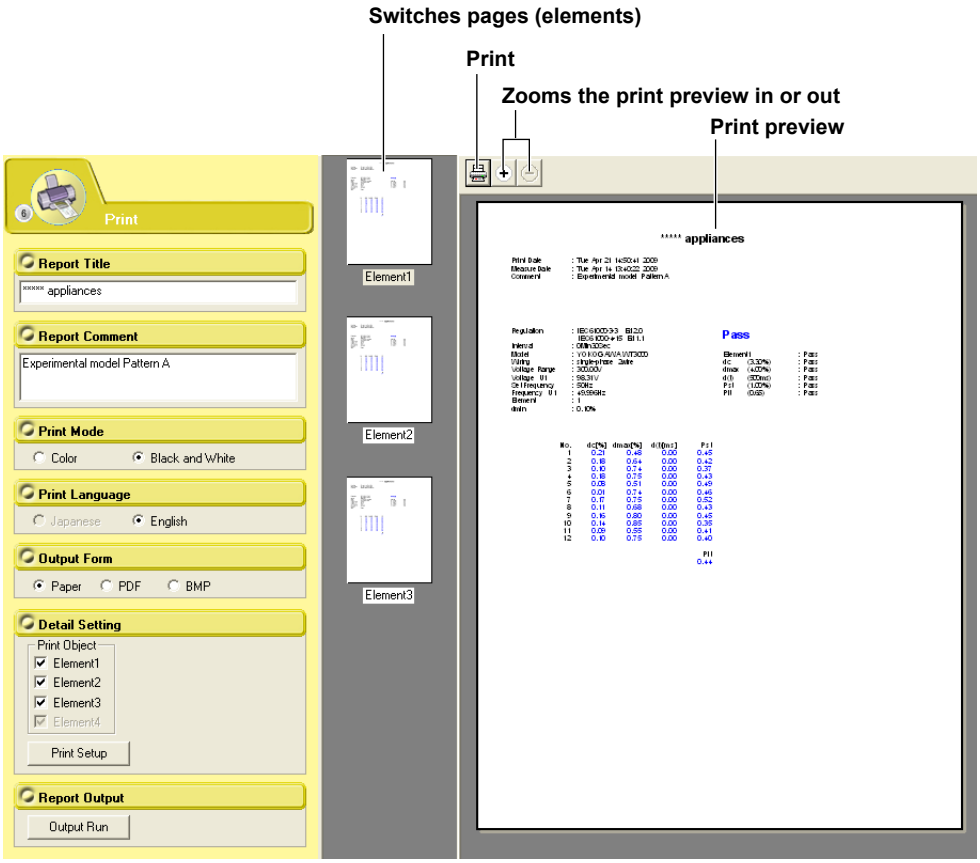
Set the print mode (section 10.2).

Set the print language (section 10.2).

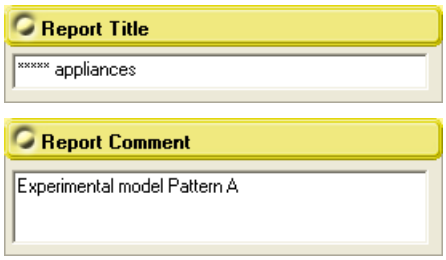
Set the output form (section 10.2).

Set print options (section 10.3).

Print (section 10.4).



2. Enter the report title and the report comments in their respective boxes.

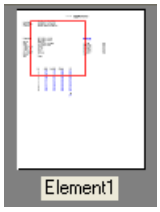


Explanation

You can create reports using the data measured with the software.

Print Preview Display Range

If the print preview is being zoomed in on, the displayed area is indicated with a red frame.



Moving the Print Preview Display Range

Drag the red frame (which indicates the display range) to move the display range.

Setting the Title and Comment of Reports

As necessary, you can set the title and comment of a report.

- **Number of Characters That Can Be Entered**

  See the table below.

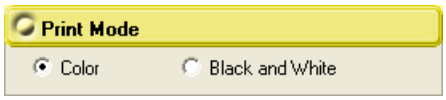
Item	Number of Characters That Can Be Entered
Title	Up to 40 characters can be entered.
Comment	Up to 1000 characters can be entered. Up to 90 characters can be displayed on one line. Up to 6 lines can be displayed.

10.2 Setting the Print Mode, Print Language and Output Form

Procedure

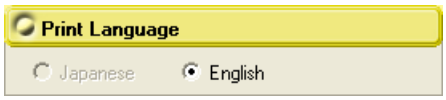
Selecting the Print Mode

1. Select Color or Black and White under Print Mode. When you change the print mode, the print preview in the setting and display area will change accordingly.



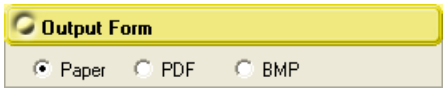
Selecting a Print Language

2. Select English or Japanese under Print Language. When you change the print language, the print preview in the setting and display area will change accordingly.



Selecting a Output Form

3. Select Paper, PDF or BMP under Output Form.

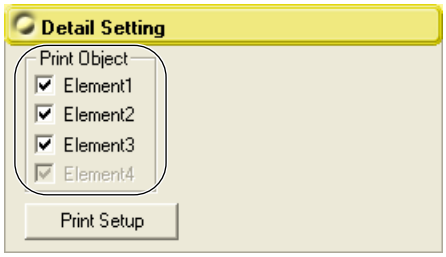


10.3 Setting Print Details (Detail Setting)

Procedure

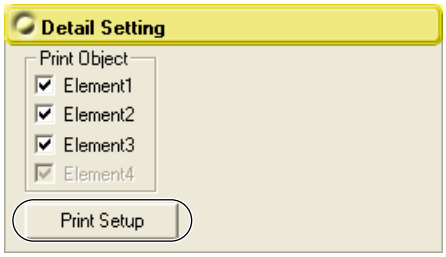
Selecting the Elements Whose Data You Want to Print

1. In the Print Object box, select the elements whose data you want to print.

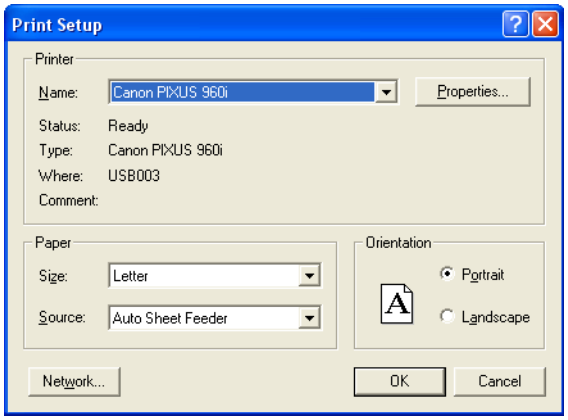


Setting Up the Printer

1. Choose **Print Setup**. The Print Setup dialog box opens.



2. Enter appropriate settings for **Printer**, **Size**, **Source**, and **Orientation**.
3. Click **OK**.



Explanation

Selecting the Elements Whose Data You Want to Print

You can select the elements that were selected under Measure Object. The Measure Object setting is explained in section 7.2.

Print Setup

Make printer settings according to your system environment.

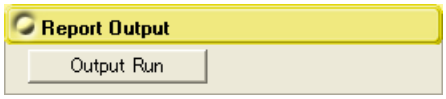
10.4 Printing

Procedure

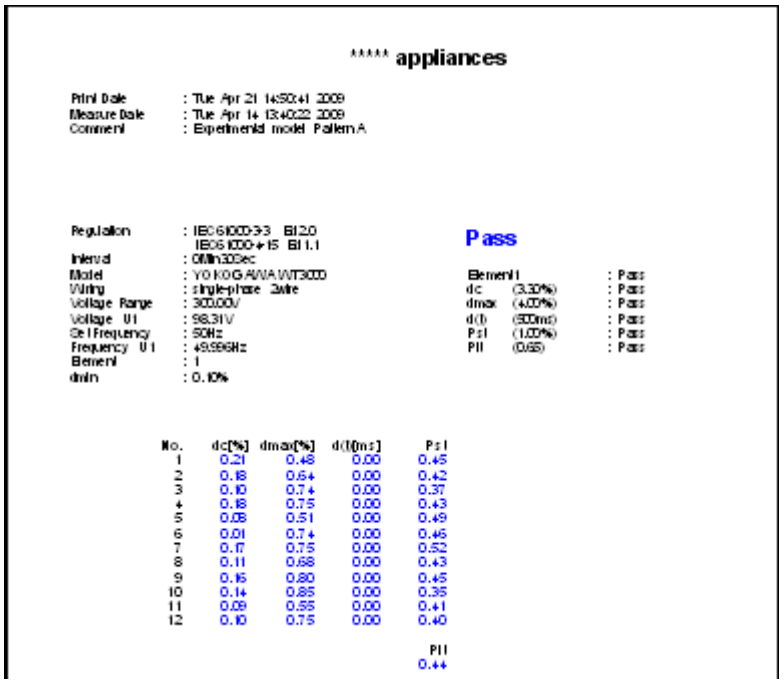
Printing a Report

You can print a report when measured data has been acquired or has been loaded from memory.

1. Click **Output Run**.
   - If Paper has been selected, proceed to step 2.
   - If PDF or BMP has been selected, proceed to step 3.



2. Enter appropriate settings for **Printer**, **Range**, **Copies**, etc. Click **OK**. The report is printed



3. Set the **location** and **file name** to save to. Click **Save**. The report is saved in the specified output format (PDF or BMP).

Printing a Report Using the Print Button

1. Click the button. A Print dialog box appears.
2. Enter appropriate settings for **Printer**, **Range**, **Copies**, etc. Click **OK**. The report is printed

Explanation

Set the printer according to the environment of the system that you are using.

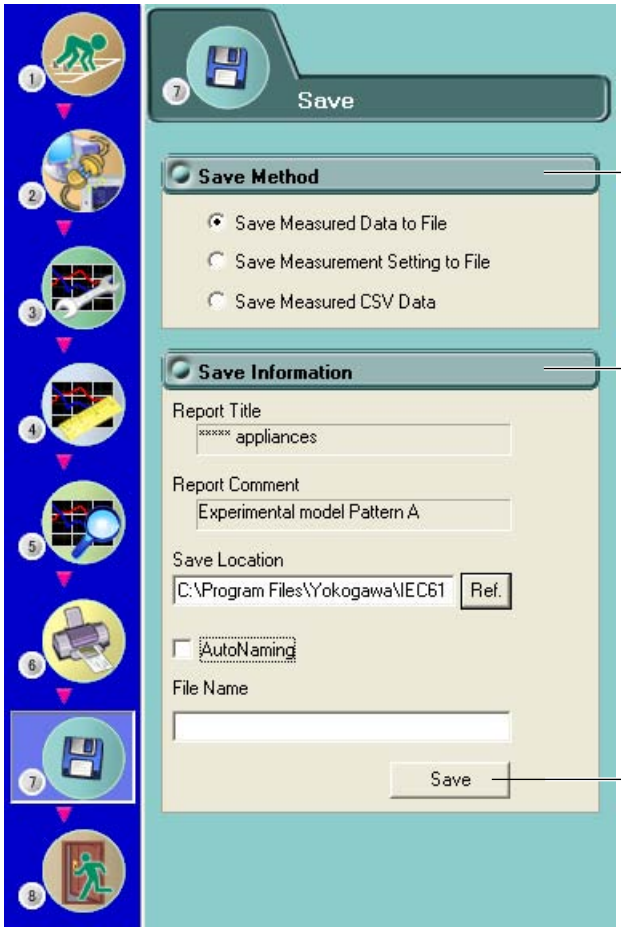
Printing Reports

You can print a report when the measured data has been retrieved (or loaded).
You can print a report for each input element (see section 10.3).

11.1 Saving Setting Information and Measured Data

Procedure

1. Select the icon in the menu area. The Save submenu appears.



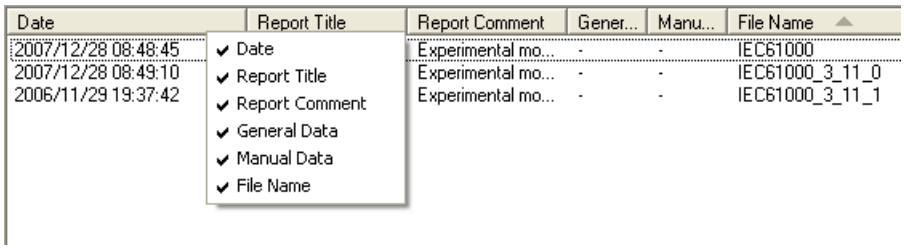
Save Method (page 11-2)
Select the type of data to save and the file format to save it to.

Save Information (page 11-2)
Set the location and file name to save to.

Execute save operation (page 11-2).

Configuring File Information Display Settings

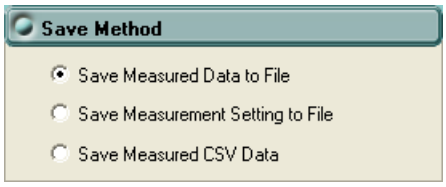
1. Right-click on the file information heading area at the top of the setting and display area. A list of the different types of information that can be displayed appears.
2. Select the type of information that you want to be displayed.



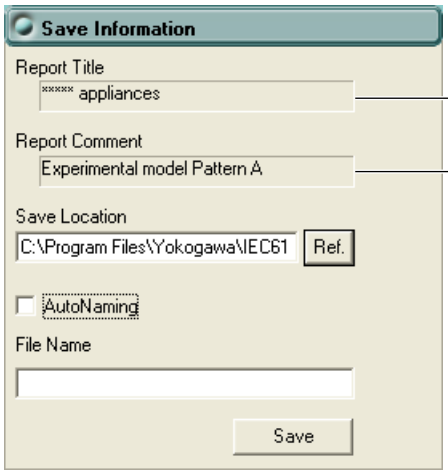
Saving the Measured Data

You can save the measured data when the measured data has been retrieved (or loaded).

1. Click **Save > Save Measured Data to File**.



2. After selecting a folder in the **Save Location** box, enter the name of the file you want to save in the **File Name** box.
3. Click **Save** to save the measured data.



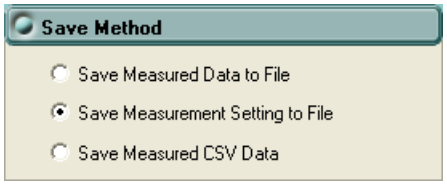
Section 10.1 explains how to set report titles and comments.

Note

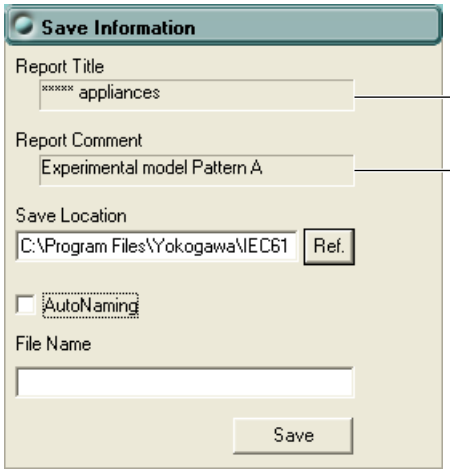
You cannot save the measured data while the measurement is in progress.

Saving the Setting Information

1. Click **Save > Save Measurement Setting to File**.



2. After selecting a folder in the **Save Location** box, enter the name of the file you want to save in the **File Name** box.
3. Click **Save** to save the setting information.



Section 10.1 explains how to set report titles and comments.

Note

You cannot save the setting information while the measurement is in progress.

Explanation

Kinds of File Information

- Date: When the file was saved. Displayed in this format: year/month/day hour:minute: second
- Report Title (See section 10.1)
- Report Comment (See section 10.1)
- General Data: If data acquired in General mode (normal voltage fluctuation and flicker measurement) is contained in the file, an asterisk appears here.
- Manual Data: If data acquired in Manual mode (measurement of dmax caused by manual switching) is contained in the file, an asterisk appears here.
- Click ▼ or ▲ to switch between sorting in ascending and descending order.

Saving Measured Data

You can use this software to save the measured voltage fluctuation and flicker data that the PC has acquired from the WT to a file. When the software saves this data, it will also save the WT voltage fluctuation and flicker measurement conditions along with the setting information described below.

File Name/Extension

- You can select any file name that the PC will recognize.
- When you choose to save a file, two files will be saved with the same file names but with these different extensions:
  Extension: .fdt Measured data
  .ini Setting information

Saving Setting Information

When in online mode, the software can save the following setting information to a file.

- Measurement and judgment conditions (see chapter 7)
- Graph display settings (see sections 9.2 and 9.3)
- Report titles and comments (see section 10.1)

File Name/Extension

- You can select any file name that the PC will recognize.
- Extension: .ini

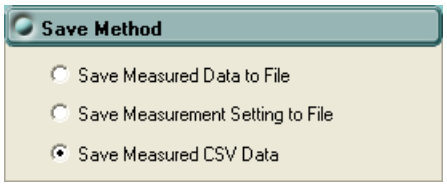
11.2 Saving Measured Data as a Report in CSV Format

You can save measured data as a report in CSV format.

Note

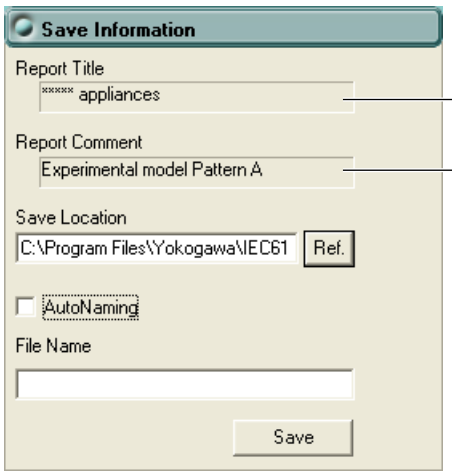
You cannot save measured data in CSV format while measurement is taking place.

1. Select **Save Measured CSV Data**.



2. Specify the **Save Location**, and enter the file name in the **File Name** box.

3. Click **Save**. The measured data is saved to CSV format.



Section 10.1 explains how to set report titles and comments.

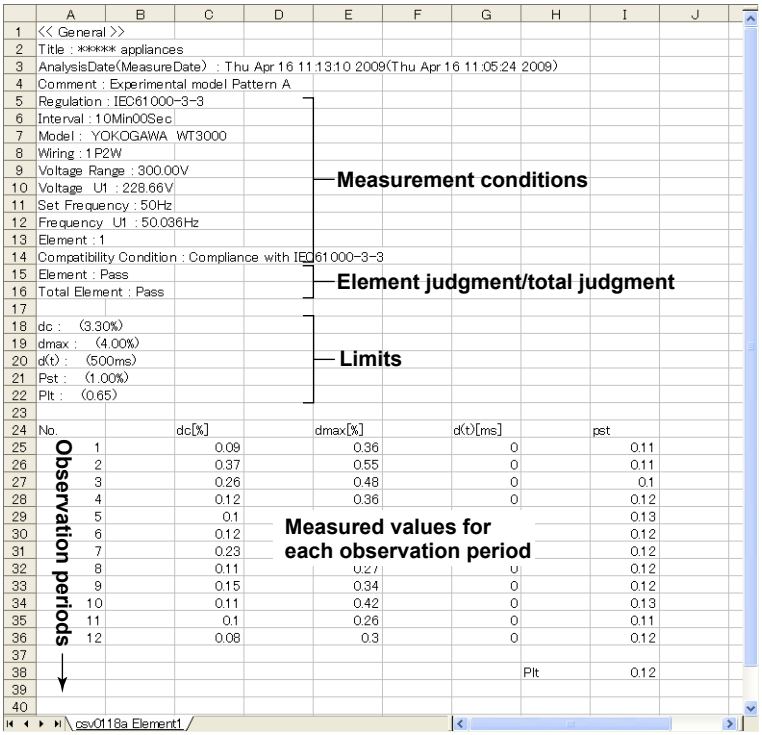
Explanation

This section explains how to save measured data as a report in CSV file format. When you save the data in CSV format, you can view it using a PC spreadsheet program (such as Microsoft Excel).

File Name/Extension

You can select any file name that the PC will recognize.
Extension: .csv

Example of Measured Data Saved to CSV Format and Then Opened Using Microsoft Excel



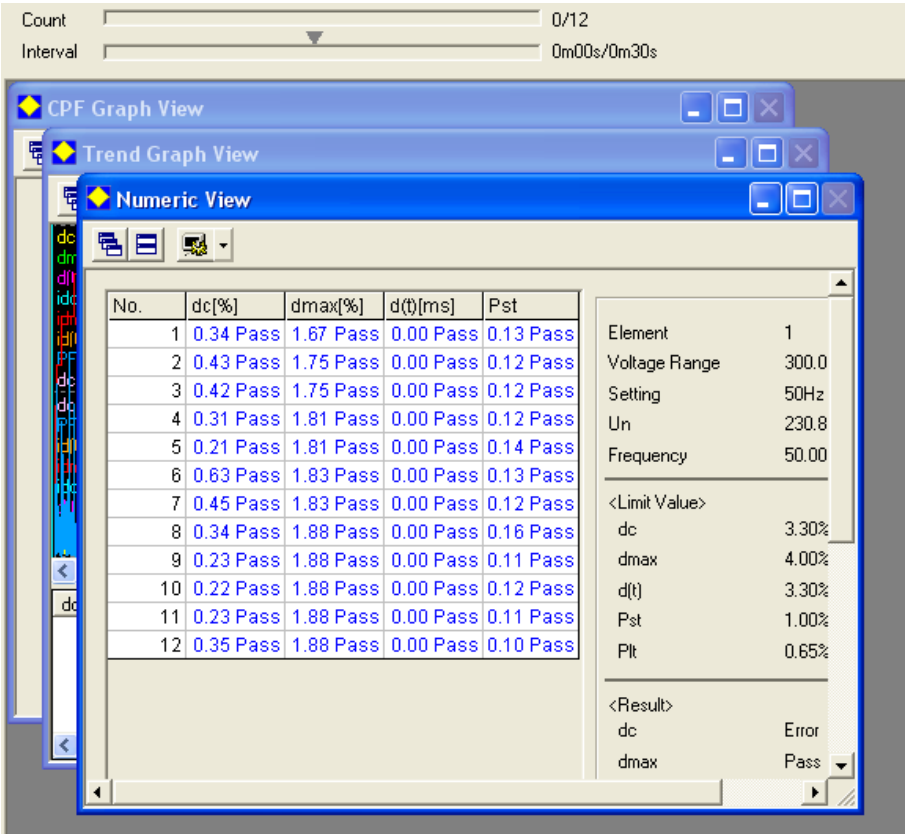
	A	B	C	D	E	F	G	H	I	J
1	<< General >>									
2	Title : ***** appliances									
3	AnalysisDate(MeasureDate) : Thu Apr 16 11:13:10 2009(Thu Apr 16 11:05:24 2009)									
4	Comment : Experimental model Pattern A									
5	Regulation : IEC61000-3-3									
6	Interval : 10Min00Sec									
7	Model : YOKOGAWA WT3000									
8	Wiring : 1P2W									
9	Voltage Range : 300.00V									
10	Voltage U1 : 228.66V									
11	Set Frequency : 50Hz									
12	Frequency U1 : 50.036Hz									
13	Element : 1									
14	Compatibility Condition : Compliance with IEC61000-3-3									
15	Element : Pass									
16	Total Element : Pass									
17										
18	dc : (3.30%)									
19	dmax : (4.00%)									
20	d(t) : (500ms)									
21	Pst : (1.00%)									
22	Plt : (0.65)									
23										
24	No.		dc[%]		dmax[%]		d(t)[ms]		pst	
25		1	0.09		0.36		0		0.11	
26		2	0.37		0.55		0		0.11	
27		3	0.26		0.48		0		0.1	
28		4	0.12		0.36		0		0.12	
29		5	0.1						0.13	
30		6	0.12						0.12	
31		7	0.23						0.12	
32		8	0.11		0.27		0		0.12	
33		9	0.15		0.34		0		0.12	
34		10	0.11		0.42		0		0.13	
35		11	0.1		0.26		0		0.11	
36		12	0.08		0.3		0		0.12	
37										
38								Plt	0.12	
39										
40										

12.1 Cascading Windows

Procedure

Click . The windows are cascaded so that you can see the title of each window.

An Example of Cascaded Windows within the Analysis Window



Explanation

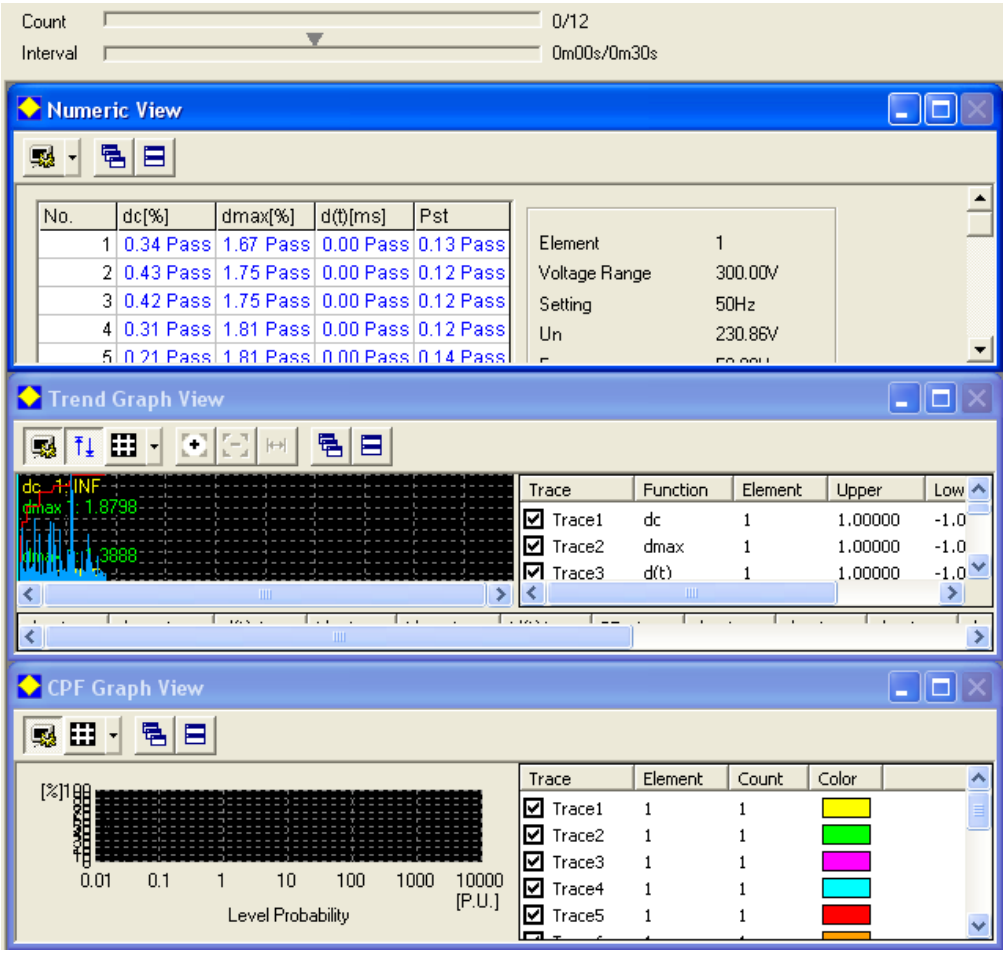
- Windows are cascaded so that the title of all displayed windows can be seen.
- The active graph or list window becomes the front window after the cascade operation.
- The cascade order varies depending on the type of displayed window.

12.2 Tiling Windows

Procedure

Click . The windows are tiled so that they do not overlap with each other.

An Example of Tiled Windows within the Analysis Window



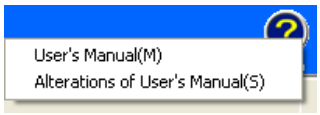
Explanation

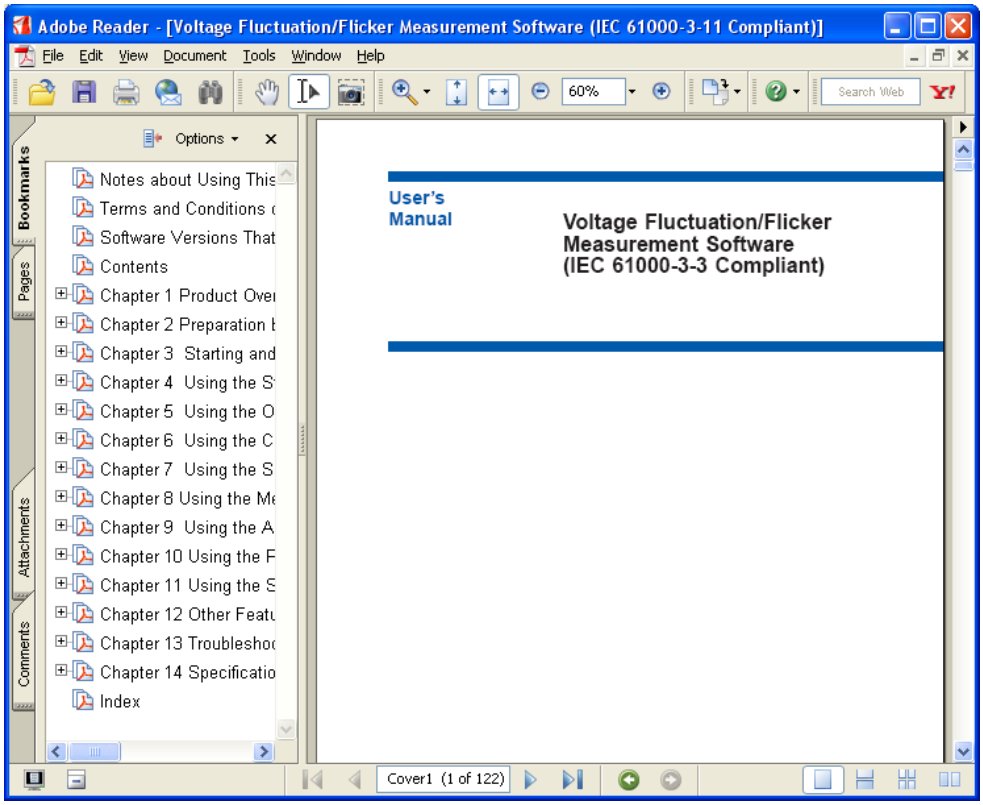
- All the displayed windows are tiled so that the windows do not overlap each other.
- The active graph or list becomes the active window after carrying out the tile operation.
- The arrangement order varies depending on the type of displayed windows.

12.3 Using the Help Function

Procedure

Click , the help button. If Adobe Reader is installed on the PC, it will start up and open the PDF User's Manual for this software.





Explanation

Online Help

The user's manual is displayed as a help document in PDF (Portable Document Format).
You can find information about operating procedures of this software and terminology.
You can view PDF files using Adobe Reader, a freeware.
If there is an alteration notice, you can display it by clicking Help and then clicking **Alteration Notice**. This will open a PDF file of the alteration notice.

Viewing the Most Recent User's Manual or Alteration Notice

To obtain the most recent PDF files of the user's manual and alteration notice, go to the following Web page, and then browse to the download page.

http://tmi.yokogawa.com/service-support/downloads/

Rename the downloaded user's manual and alteration notice as indicated below according to the product that you are using, and copy (overwrite) the files in the software installation folder that you specified when you carried out the steps on page 2-8. You will be able to view the most recent operating instructions by selecting the user's manual or alteration notice from the Help menu.

Product	User's Manual File Name	Alteration Notice File Name
WT3000	IM761922-07E.pdf	Alterations-07E.pdf

Note

- You can download Adobe Reader from Adobe System's Web page.
- The most recent users manual and alteration notice that you can download from YOKOGAWA's Web page correspond to the most recent version of this software program. Update the software program as necessary. The program for updating the software can be downloaded from YOKOGAWA's Web page above.

12.4 Viewing Version Information

The IEC 61000-3-3 Voltage Fluctuation and Flicker Measurement Software version number appears in the information area.

Note

- The software version is different for each operation mode indicated below.
  - IEC 61000-3-2 Harmonic Measurement
  - IEC 61000-3-3 Voltage Fluctuation and Flicker Measurement
  - IEC 61000-3-11 Voltage Fluctuation and Flicker Measurement
  - IEC 61000-3-12 Harmonic Measurement

  If any function is updated, the version of the other function may not change.
- For the most recent version of the software, check the YOKOGAWA's Web page below.
  http://tmi.yokogawa.com/products/digital-power-analyzers/
  The program for updating the software as well as the most recent user's manual and alteration notice (see section 12.4) can be downloaded from YOKOGAWA's Web page above.

13.1 Troubleshooting

If a message is displayed on the PC display, see section 13.2, “Error Messages.” If servicing is necessary or if the software is not operating correctly after performing the corrective actions, contact your nearest YOKOGAWA dealer.

Problems and Solutions	
If you cannot connect to the WT3000 via GP-IB:	
	A GP-IB connection made to the WT may not work properly if the GP-IB card that is used is not made by NI (National Instruments). We recommend that you use a National Instruments GP-IB card (see section 1.2).
Measurement stops suddenly.	
	Close the memory-resident software running on the PC. For example, if virus checking software frequently checks the communications between this software and the PC, the performance of the PC may decline drastically. If you choose to stop the virus check and use the PC, please do so in a network environment that is well protected against viruses.

13.2 Error Messages

Message	Corrective Action
Measured data will be initialized. Do you want to execute?	Select OK to initialize the measured data. Otherwise, select Cancel.
Data was lost. Please check your settings and try again.	The communication may be disconnected. Check the cable, noise, etc.
Connection error. Please check your settings and try again.	Check the following items. • The WT is turned ON. • The GP-IB or Ethernet cable is connected properly. • For GP-IB, check that a unique GP-IB address is assigned within the system. Check that the GP-IB address specified on the WT matches the address specified on the software. Check that the GP-IB communication driver is installed correctly in the PC. • For Ethernet, check that the IP address, user name, and password specified on the WT match those specified on the software.
Peak over. Please check your settings and try again.	Check that the voltage or current range is appropriate.
Frequency error. Please check your settings and try again.	Check the frequency and voltage range.
Unrecognized error. Please check your settings and try again.	An unexpected error occurred. Contact your nearest YOKOGAWA dealer.
All the data will be discarded. Do you want to continue?	Select OK to discard the current data. Otherwise, select Cancel.
Write failed.	Check the destination medium. • Check that the storage medium is present. • Check that there is enough free space on the storage medium. • Check that the storage medium is formatted. • Check that the storage medium is not write-protected.
Please input a value from 0.0001 to 99999.9999. Please input a value from 0.01 to 999.99. Please input a value from 1.00 to 99.99. Please input a value from 0.10 to 99.99. Please input value from 0:30 to 15:00. Please input a value from 1 to 99999. Please input a value from 1 to 99. Please input a value from 0.10 to 9.99.	The value you tried to specify is out of range. Set the value within the allowed range.

Specifications

Item	Specifications
Software	The voltage fluctuation and flicker measurement software measures the voltage fluctuation and flicker of electrical or electronic equipment according to the IEC Standard and indicates/saves the results of judgments made according to the standard. The executable file name is IEC61000.exe.
Applicable instruments	WT3000 (models 760301, 760302, 760303, and 760304)
Applicable standards	Voltage fluctuation and flicker suppression standards • IEC 61000-3-3 Edition 2.0:2008 • EN 61000-3-3:2008 Flicker meter function and design specifications • IEC 61000-4-15 Edition 1.1:2003, IEC 6100-4-15 Edition2.0:2010 • EN 61000-4-15:1998, EN 61000-4-15A1:2003, EN 61000-4-15:2011
Functions	Retrieve and load the measured data to be judged • Set the WT measurement conditions • Retrieve measured data from the WT connected online (On-Line mode) • Load measured data already saved (Off-Line mode)
	Measure mode • Normal voltage fluctuation and flicker measurement Calculates all the voltage fluctuation and flicker values of dc, dmax, d(t), Pst, and Plt, compares them to the preset limits, and indicates the overall judgment. • Measurement of dmax caused by manual switching Measures the maximum relative voltage change, dmax, when the EUT switch is manually turned ON and OFF, determines the average over 24 measurements, and compares and judges against the limit.
	Set the WT measurement conditions Set the measurement conditions of the voltage fluctuation and flicker measurement that is defined in IEC 61000-3-3 Edition 2.0.
	Set the WT judgment conditions Set the judgment conditions of the voltage fluctuation and flicker measurement that is defined in IEC 61000-3-3 Edition 2.0.
	Set the title and comment of reports Set the title/comment of reports. Reports are printed and saved to .bmp or .pdf files along with measured data.
	Start/stop the measurement Measurement can be started in On-Line mode.
	Numeric data and judgment Display the judgment result indicating whether the measured data of voltage fluctuation and flicker measurement is within the specified limits as well as the measured data.
	Trend graph view • Display the trend graph of the normal voltage fluctuation and flicker measurement (dc, dmax, d(t), idc, idmax, id(t), and IFS). • Display the trend graph of measurement of dmax caused by manual switching (dmax).
	CPF graph view Display the CPF graph of the normal voltage fluctuation and flicker measurement.
	Save and load the setting information and measured data • Save and load the setting information Save various types of setting information including measurement conditions, judgment conditions, title and comment of reports. Loading of the setting information is also possible. • Save and load the measured data Save the measured data of the voltage fluctuation and flicker to files. The setting information above is also saved. The voltage fluctuation and flicker measurement data and setting information saved to a file can also be loaded.
	Save measured data in CSV format Save measured voltage fluctuation and flicker data reports in CSV format. The saved data can be loaded in a software application on the PC.
	Printing and saving of reports Reports can be saved to .pdf or .bmp files. Report files can also be printed.
PC system requirements	See section 1.2.

Index

A

Page

address 6-3
applicable measurement instruments 1-1
applicable standard 1-1, 1-8
auto ranging 9-8

C

Page

cascading 12-1
Color 8-6, 8-18, 9-10, 9-13
comments 10-1
communication address 6-2
connection 6-1
connection condition 6-2
connection device 6-2
connection status 3-3
count 9-13
CPF 1-15
CPF graph view 1-4
CSV file, saving to 11-5
CSV format 11-5
cumulative probability function 1-15
cursor 9-11

D

Page

d(t) 1-13, 7-11
dc 1-13, 7-10
display during measurement 8-7, 8-19
dmax 1-13, 7-10, 7-12
dmax, classification 7-2
dmax, judgment of the average 9-3, 9-4
dmin 7-9

E

Page

Element 8-6, 8-18, 9-10, 9-13
element, selection of 9-5
element judgment 8-20, 9-2, 9-3, 9-4
error messages 13-2
Ethernet control 2-2, 2-5

F

Page

file information 5-2, 11-2
flicker 1-13
flicker measurement flowchart 8-9
flicker measurement status 8-8, 8-21
flicker meter function and design specifications 1-8
frequency filter, copying 7-5
Function 8-6, 9-9
functions, explanation of 1-1

G

Page

General Mode 7-8, 7-9
GP-IB control 2-1, 2-3
graph 9-12
grid 9-8

H

Page

help 12-3

I

Page

icon 3-4
IEC 61000-3-3 1-8
IEC 61000-4-15 1-8
IFS 1-15
information area 3-3
information bar 3-3
installation 2-7
instantaneous flicker sensation 1-15

J

Page

judgment, displaying of 8-16
judgment by measurement item 9-4
judgment conditions 7-8
judgment display when the measurement is complete 8-20

L

Page

limits 1-9, 7-8, 7-10, 7-11, 9-4
line filter, copying 7-5
long-term flicker value 1-14, 7-11
Lower 9-10

M

Page

Manual dmax Mode 7-8, 7-9
maximum relative voltage change 1-13, 7-10, 7-12
measured data, loading 1-2, 5-1
measured data, re-judgment of 8-5, 8-16
measured data, saving in CSV format 11-5
measured value and judgment for each observation period 9-4
measurement, initialization of 8-8, 8-20
measurement, resetting of 8-20
measurement conditions 7-4, 9-4
measurement count 7-9
measurement items 1-3
measurement mode 7-9
measurement of dmax caused by manual switching 1-4, 7-9
measurement of dmax caused by manual switching, execution of 8-10
measurement of dmax caused by manual switching, flow chart of 8-21
measurement target frequency 7-9
measure mode, selection 7-8
measure object 7-5
menu area 3-3

N

Page

new connection 6-1
normal voltage fluctuation and flicker measurement 1-4, 7-9
normal voltage fluctuation and flicker measurement, execution of 8-1
numerical judgments, displaying 9-1
numeric data and judgment view 1-4

O

offline, switching to 6-7
offline mode 1-6
one observation period 7-9
online 6-3
online mode 1-6
operation, flow chart 1-11
overall judgment 8-20, 9-3, 9-5

P

password 6-3
period during which relative voltage change exceeds the threshold level 1-13, 7-11
Plt 1-14, 7-11
preparation flow chart 1-11
printer setup 10-5
printing 10-1
print language 10-4
print mode 10-4
print preview 10-2
Pst 1-14, 7-11

R

range, copying 7-5
rated voltage 7-9, 8-8, 8-20
relative steady-state voltage change 1-13, 7-10
remeasuring 8-14
report, printing 10-6
reports 10-1

S

scaling settings, copying 7-5
setting and display area 3-3
setting information, loading 5-1
short-term flicker value 1-14, 7-11
slider 9-11
software, closing 4-6
software, starting 3-1
software license, terms and conditions of v
software window 3-3
specifications 14-1
standard, selection 3-1
standard test schedule menus 4-2
starting/stopping measurement 1-4
starting the software 3-1
steady-state condition 1-13
steady-state range 7-9
submenu area 3-3
system requirements 1-7

T

terminology related to flicker 1-13
test, resetting 8-5, 8-17
test, starting 8-4, 8-12
test, stopping 8-5, 8-15
test flowchart 1-11
test initialization 8-3, 8-11
test schedule menu, selection 4-1
test schedule menus 1-1
tiling 12-2
time marker 8-10, 8-19
title 10-1
Trace 8-6, 8-18, 9-9, 9-13
trace, setting of 9-9, 9-13
trend graph 8-6, 8-18, 9-6
trend graph, setting of 9-8
trend graph view 1-4

U

Upper 9-10
user's manual 12-3
user name 6-3
User Setting 4-3

V

version information 12-5
voltage fluctuation and flicker suppression standards 1-8
voltage frequency 8-8, 8-20

W

windows, cascading 12-1
windows, tiling 12-2
wiring 1-10
wiring pattern 7-2

Z

zoom in/out 9-11